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ABSTRACT

This report contains a collection of papers concerning institutional research for stabilizing and declining enrollments which were presented at the 1973 Association for Institutional Research (AIR) Annual Forum in Vancouver, B.C. in May 1973. The topics include the role of institutional research in the planning process; enrollment projection studies at the state and local level; cost, funding formulas and budgeting; and faculty staffing. (Author)

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INSTITUTIONAL RESEARCH FOR STABILIZING AND DECLINING ENROLLMENTS

Workshop for Experienced Institutional Researchers

Co-Chairman: Alton L. Taylor

University of Virginia

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Introduction

The continued financial crisis in higher education can be explained, to some degree, in terms of inflation, reduction of federal monies, increased salaries with no corresponding increase in productivity, and increased costs for non-instructional goods and services, libraries, maintenance, fuel, insurance, and other general institutional expenses. Simultaneously, student enrollments in many institutions are declining or stabilizing because of cut-backs in the draft reducing pressure to obtain educational deferments, increased costs of going to college, reduced sources of revenues for students to pay for college education, lack of job opportunities after college, general disenchantment with higher education, reduced rate of increase for college age population, and establishment of more community colleges. These are the presuppositions upon which selected issues have been selected for consideration in relation to institutional research in a declining or stabilizing setting.

In order to establish a perspective for institutional research thrusts during a stabilizing enrollment situation, initial considerations for planning are desirable by which research efforts may be directed. Thus, the first paper consists of the rationale and basic procedures for institutional planning and considerations for the role of institutional research to complement the planning process. The second paper includes a description for conducting statewide enrollment studies with implications for institutional enrollment projections. The third paper explores changes in costs, funding formulas and budgeting, and the concluding paper raises issues with selected faculty staffing problems in a stabilizing setting.

Primarily, rising student enrollments have kept educational costs at a relatively low level. With stabilizing or declining enrollments, costs will probably rise quite rapidly. Significant issues need to be considered to help plan and meet the basic problems associated with decreased student enrollments and increased costs. These papers were planned to make a helpful contribution to the financial dilemma associated with stabilizing or declining enrollments.

Alton L. Taylor

ALT:g
May 1973

TOPICS AND PARTICIPANTS

Planning Constructs and Implications for Institutional Research - Carroll A. Gardner, Jr., University of Virginia

State-Wide Enrollment Analysis and Institutional Implications for Total Enrollments and Program Enrollments - Donald J. Finley, State Council of Higher Education for Virginia
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Dollar Dilemmas: Changes in Costs, Funding Formulas and Budgeting - A. Lawrence Fincher, University of Michigan
Resource Person - Jerry J. Baudin, Louisiana State University

Faculty Staffing Analysis: Who stays, Who Goes, and When? - Herbert E. Coolidge, University of Virginia
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PLANNING CONSTRUCTS AND IMPLICATIONS FOR INSTITUTIONAL RESEARCH

Prepared by: Carroll A. Gardner, Jr.

for the

Workshop for Experienced Institutional Researchers

on

Institutional Research for Stablizing

and Declining Enrollments

at the

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The Need for Long-range Planning

> An important thing to understand about any institution or social system is that it doesn't move unless it's pushed. And what is generally needed is not a mild push but a solid jolt. If the push is not administered by vigorous and purposeful leaders, it will be administered eventually by an aroused citizenry or by a crisis.[1]

I venture to say that all of us agree that higher education today is being pushed — pushed by purposeful leaders who are initiating structural changes in their institutions to accommodate new methods of planning for institutional stability in an uncertain future; pushed by an aroused citizenry questioning the value of an educational process that permits students to disrupt that process and pays those faculty the most who teach the least; pushed by a financial crisis in which costs have increased faster than income. What could have caused higher education to change so drastically, in the eyes of so many, in such a short period of time?

Part of the answer lies in the rapid growth of higher education, in size and scope. In the decade of the 1960's higher education more than doubled its enrollment, from three million to over six million students.[2] More than half of all

high school graduates are now going on to attend colleges and universities. Many have enjoyed the benefits of this rapid growth in higher education. More and more students have been given an opportunity to continue their education beyond high school, and financial assistance has been available to those who otherwise would not have been able to afford to attend a college or university. Faculty have enjoyed larger salaries and better working conditions than they or their predecessors enjoyed a few years before. Taxpayers were satisfied knowing their dollars were supporting a process that provided greater educational and occupational opportunities than were available in previous years.

At the same time that many were enjoying these benefits of growth, certain problems and future difficulties were developing. Additional facilities were built to meet the increasing demand for education at the risk of being overdeveloped when that demand slackened. Academic programs and courses proliferated, probably not as much to meet student demand for educational diversity, as for faculty desire to explore their own esoteric interests. Faculty salaries were increasing dramatically, and faculty members were promoted at a more rapid rate during the period when additional staff were in short

supply. While these situations were developing within the institutions, inflation was beginning to create problems in the economy of the nation.

It now appears that the period of rapid growth is coming to a close, and we must resolve our present problems and plan for the future. The temptation to relate all of our present and future problems to the current financial crisis is great, but that would be simplifying a complex interaction of many other more specific problems. One of the major problems, the one chosen as the topic of this workshop, is that of declining student enrollments. This decline is occurring at a time when the college-age population in the nation is increasing. There are a number of factors affecting enrollment figures at specific institutions, including an increasing student interest in community colleges and vocational-technical education, and young people postponing or interrupting their post-secondary education or deciding not to continue their education beyond high school.

Now that higher education has grown to be such a large and important part of society, many are viewing the enterprise with a very critical eye. Taxpayers are being reminded that there are other important social needs that must be supported

by their dollars. Higher education is competing for scarce tax dollars with such worthy causes as mental health, penal reform and health care delivery. The cost of higher education makes it prohibitive for some to take advantage of it. These costs are causing others to question the ways these funds are being used. Legislators contend that some faculty salaries are too high and that the faculty should be teaching more students and more courses.

At the same time that these criticisms are being made, there are increasing demands for greater diversity in the types of academic opportunities and programs now offered in higher education. In addition to smaller classes, independent study, esoteric courses and special programs, these demands also include the three-year baccalaureate, credit by exam, recognition for work experience and other non-traditional proposals. The nature and origin of these demands suggest that they may be coming from students frustrated by the traditional course offerings, faculty stimulated by their special academic interests and programs, or administrators spurred by their concern for cutting costs.

I join those who contend that long-range planning is essential to meet the present problems, salvage the best of our

past accomplishments, and guide our future efforts in post-secondary education. Comprehensive planning, which includes academic and financial as well as physical planning, is necessary if we are to cope successfully with the complexities of the system of post-secondary education as well as the institutions themselves. Those responsible for the future of higher education in their institutions are called upon to improve the academic and experiential programs of the institution and, at the same time, make the most efficient and effective use of resources. The demands to reevaluate and revise programs to meet the rapid changes in the educational and social environment, and to implement new academic programs and educational techniques cannot be met adequately without the conceptual framework that comprehensive planning demands.

Underlying Principles of Long-range Planning

Certain fundamental principles are basic to the establishment and implementation of long-range planning in institutions of higher education. The first and most important of these principles is the commitment of the institution to the process of long-range planning. The governing board, the president, and the key academic personnel and administrative officers

of the institution must give their full support to the concept of long-range planning. If the planning process does not have the understanding and support of the chief academic and administrative officers, it can hardly gain the acceptance of the faculty and students in the institution. They may identify the process as merely a clever device to impose unpopular administrative decisions upon the faculty. Furthermore, it is unlikely that faculty and students will be committed to the process unless they are involved in the initial stages of its development.

As part of this institutional commitment to long-range planning, a planning officer should be designated, and his primary responsibility should be the coordination of academic, physical, and financial planning at the institution. The planning officer should be given adequate staff to assist him in carrying out his responsibilities and should not be encumbered with additional administrative responsibilities which would take time away from his most important task of coordinating the planning process.

A second underlying principle of long-range planning is the institution's commitment to support the development of an adequate system to gather, analyze and evaluate information.

The planning process cannot function effectively without information relating to students, faculty, facilities, courses, programs and costs. Two distinct operations are included in this process. The first operation involves the collection and reporting of summarized but unanalyzed data. This is usually the function of those responsible for the institution's data-processing operation. The second operation involves the analysis, interpretation and evaluation of complex data. The translation of these data into comprehensible information to serve the planning process is the central function of institutional research.[3]

It is imperative that the institution commit itself to supporting both of these operations. Data gathering, analysis and evaluation will provide decision-makers with a greater information base than they have heretofore employed. Decision-makers can have greater confidence in their decisions when they have had an opportunity to view possible consequences of alternative decisions.

The third underlying principle is the commitment of the institution to involve in the planning process those considered to have significant input as well as those responsible for implementing the resulting plans. Faculty and students

should be involved in the planning process from the very beginning of its development. Any planning process must be adapted to the unique requirements and resources of each individual institution. It is the people in the institutions themselves who understand best the strengths and weaknesses of the institution and can provide valuable input as to the subjective and objective factors which influence these strengths and weaknesses. Those persons responsible for formulating and implementing plans on the lower level of the institution's organizational structure must be participants in the overall planning process, if there is any hope for the success of the resulting plans.

Participation in the planning process by friends, legislators, and citizens outside the institution, will greatly enhance the planning process. Input from experts and concerned persons, both inside and outside the institution, is necessary in establishing the overall goals of the institution. Once these goals have been established, the knowledge and expertise of these individuals are necessary in determining alternative courses of action, and their influence and support are needed to implement the final decisions.

The Long-range Planning Process

The purpose of this section is to describe the basic steps in the planning process. No attempt to offer a specific step-by-step design for long-range planning is intended. Rather, the following summarizes the author's suggestion of basic steps in the planning process that an institution may adapt to its own particular and unique set of circumstances.

The first stage of the planning process calls for a comprehensive study and description of the current conditions in the institution. This step in the planning process shall include the systematic gathering, analysis and evaluation of data on faculty, students, staff, teaching, research, service functions, physical facilities, finances and other resources. Historical information, both subjective and objective, should also be studied. A description of the current conditions of the institution should include those aspects of the institution's history and traditions which have influenced its growth and development, as well as an evaluation of those likely to be important in the future. The study should identify the institution's strengths and its weaknesses as well as its present commitments.

In the second stage, those involved in the planning process must make assumptions regarding present conditions and future trends which may influence the plans of the institution. Overall population growth will have an effect on enrollment potential. Many of those who will be attending institutions of post-secondary education in 1990 will be born this year. It is possible, then, to observe the actual trends in total population and make some determination of the effect these trends may have on higher education in general and on institutions in particular. More important, and also more difficult, is the task of predicting the enrollment potential of the geographic area from which the institution currently draws most of its students. Planners must also make some assumptions regarding the trends of student interest in various types of post-secondary education. Up to the present time, it appears that students have been most interested in obtaining the traditional four-year liberal arts education. An increasing number of young people are expressing interest in different kinds of vocational and technical training. In addition, an increasing number of persons beyond college age are expressing a desire to continue their education in a formal way.

Planners should also make assumptions about current economic conditions, locally, nationally and internationally, and the possible effect these assumed conditions will have on the projected costs and sources of income of the institution. Assumptions should also be made about the political climate on the local, state, regional, and national levels. People's attitudes regarding higher education will influence their interest in and support of the enterprise, and these attitudes should be considered in any attempt to plan for the future.

At the third stage of the planning process, planners should study the institution s goals and objectives. Fundamental at this step is the determination of the basic nature and purpose of the institution. Having already collected data which describes the current conditions of the institution, and having made some basic assumptions about the present conditions and possible future trends, those persons involved in planning in the institution would be in a better position to determine the overall goals of the institution and the role it is best able to play in the system of post-secondary education. In this study of the institution's goals and objectives, it is important that planners include in their deliberations a serious consideration of the various roles being played by other institutions

of post-secondary education within the state or regional system.

Obtaining consensus on the institution's goals and objectives may be the most difficult part of the planning process. The goals of too many institutions of higher education are vague and subject to a wide range of interpretation by those inside and outside the institution. In the process of long-range planning, however, the overall goals of the institution and the specific objectives by which the institution hopes to reach these goals, must be clear, well defined and understandable. Given the variety of opinions and attitudes regarding the purpose of education, the learning process, and the role of institutions of higher education, determination of overall goals and specific objectives for the institution will be no easy task.

In the fourth stage of the planning process, planners should propose programs and plans to meet the institutions's goals and objectives. At this stage various alternatives are presented and considered. On the one hand, some alternatives may suggest new and innovative programs and techniques that can be employed to meet academic and administrative needs of the institution. Other alternatives may call for a modification or even the elimination of some present programs. Various alternatives should be judged on the basis of the information already

gathered regarding the institution's goals and objectives, its current conditions, and the assumptions made regarding the future. There should be at this stage considerable discussion of the possible long-range as well as short-range consequences of alternative decisions.

At the fifth stage of the planning process, planners must ascertain the resources necessary to implement the proposed programs and plans. These resources shall include faculty and staff needs, facilities required and financial costs of alternative programs and plans. Many consider it important that various alternative plans are discussed before resource limitations are introduced. The discussion of possible alternatives should not be inhibited by budget restraints or resource limitations. Various alternatives may be discussed again in light of the realities of available resources. Following these discussions, planners can determine those plans and programs to be implemented.

The sixth stage of the planning process calls for the implementation of those plans and programs agreed upon in the planning process. Successful implementation requires the understanding and cooperation of all those affected by and involved in the final plan. It is the responsibility of planners to

clarify any misunderstandings and concerns that arise. Faculty and students should have an opportunity to participate in the actual implementation process. They should be able to provide valuable feedback on the actual operation of the plan. It is essential that the key academic personnel and chief administrative officers of the institution continue to demonstrate their support of the final plan.

The seventh and final stage of the planning process calls for the creation of guidelines for evaluating and revising the final plans. The process should insure that the long-range plans are firm enough to guide those responsible for making future decisions, yet flexible enough to meet the rapid changes in the educational and social environment. The process should include provisions for evaluating the plans and programs as they are implemented and revising programs or methods of implementation when necessary. To maintain flexibility in the plan, there must be regular review and updating based on changes that occur in the institutional conditions, or in the educational and social environment. Planners, through the chief administrative officer of the institution, should provide the constituencies with an annual accounting of progress in the long-range plans. Specific reports of a more detailed nature may be

disseminated to the entire academic community or to particular segments of it throughout the year, but it is important that those in the institution be informed and be kept up to date on the overall success of the planning process.

Implementation of Long-range Planning and Management

In this third and final section I shall turn to the most difficult problem facing those responsible for the future of higher education. That problem is how to introduce and implement long-range planning and management systems in institutions of higher education. One might begin by emphasizing the value of long-range planning and the integral role of the process in the present and future management of our institutions and systems of higher education.

At the institutional level, long-range planning and management techniques allow planning and decision-making to be done on a rational and objective basis. The recent growth and expansion of our institutions of higher education have led to an increasing complexity of the administration and management of these institutions. Planning and management techniques are needed to meet present and future demands and to enable the institution to adapt to ever increasing societal change. A well

established planning program opens channels of communication by providing the varicus constituencies within the institution opportunities to participate in discussions of the major issues. Such discussions in turn provide valuable information for decision-making.

Institutions which engage in long-range planning can also improve their institutional and public relations. Consideration of future alternatives could lead to more cooperation among previously competing institutions. In addition, institutions will be able to interpret and present their overall goals, objectives, programs and plans to the general public in a way that convinces the critics of the need and value of higher education. Hopefully, this will result in greater moral and personal support for individual institutions as well as a growing confidence in the system of higher education.

Long-range planning can assist in tne fund-raising effort by providing documented information on the institution's long-range plans for tne future. The comprehensive picture of the institution will enable the fund-raiser to present specific plans to potential donors, who may find these particular proposals attractive to their interests. In addition, foundations and state and Federal government agencies are more likely to

provide funds to faculty and students, as well as to individual institutions, if they are convinced that the institutions are managed efficiently and effectively and the funds will be used wisely.

At the state or regional level, persons engaged in the long-range planning process in the institution will be better equipped to participate in an active and constructive way in the determination of their own institution's future as well as the future of the statewide system. Institutional representatives can introduce valuable information regarding their institution's plans which will aid in discussions of plans for higher education in the state. These same institutional representatives can bring back to the institution important information that will be helpful in the institution's attempt to formulate long-range plans.

In discussing the problems of introducing and implementing long-range planning and management systems in institutions of higher education, one could observe that, to a large extent, the use of these techniques is inevitable. The present crises in higher education, involving its management, its finances, and its relevancy, require positive action. Public demands for accountability are neither unfounded nor ill-advised.

Those responsible for the future of higher education in our institutions must take the lead to resolve the current problems and plan for the future or they will be faced with even greater and more critical problems in the future.

All of us are aware of the current demands for statewide coordination and control of post-secondary education, and the responses of individual states to establish either legislative control or voluntary coordination of all institutions within the state. It appears inevitable that agencies of the state government will be playing a larger role in the determination of the future of individual institutions. Planning and management techniques are being studied and employed in these statewide systems of higher education. They are also being used in the agencies of the Federal government. It is essential, therefore, that persons in the institutions within the state system have a clear understanding and working knowledge of these techniques.

In spite of the stated values of long-range planning and management systems, and the apparent inevitability of their use, there are still many problems that must be resolved before these systems can be implemented successfully. One of these problems is fear of the unknown. Administrators who do not

understand the planning skills and management techniques being developed are not logical candidates to support their use in the institution. They may argue that rational and objective methods are not sufficient in themselves to resolve irrational and political problems, and that employing a systems approach to improve decision-making might only obscure the human element. These administrators may show little desire to change from the status quo and prefer to take a wait-and-see attitude, living from crisis to crisis in the interim.

Faculty are also unfamiliar with the new techniques in higher education planning and management. They, too, have fears regarding the use of these techniques by administrators. At best, they have a fear of changing from the security of the present procedures, even though tney are beginning to recognize that the present procedures are inadequate. At worst, they consider the introduction of management techniques to be a threat to academic freedom. They may fear that these techniques will be implemented at the expense of the learning process and that they soon will be told what to teach, to whom they must teach it, and how many hours per week they must be engaged in this endeavor.

Another problem of implementation is the reluctance

of faculty and others to participate in the long-range planning process. Faculty may consider such participation a waste of valuable time that might otherwise be spent in research and other professional commitments. Furthermore, they may consider tne process so complex that it would take too much of their time and energy to understand it. Faculty reluctance to participate may also be a manifestation of their resistance to centralized planning.

Another problem involves the additional costs of implementing and maintaining planning and management systems. At a time when financial and personnel resources are scarce, planning and management systems call for an increase in the number of skilled administrators, the use of valuable time of administrators and faculty now engaged in other important work, and the purchase of expensive hardware and software and other facilities and equipment.

Implications for the Institutional Researcher

If planning and management systems are considered to be valuable, and if, as it appears, their eventual use is inevitable, then it follows that they should be implemented at institutions of higher education. If there are fears of these

techniques, a lack of understanding of how the techniques can be useful in an academic setting, and a reluctance to participate in the process, then it becomes important to overcome the basic fears, clarify any misunderstandings, and stimulate participation at all levels. The institutional researcher can play a key role in this process, both personally and professionally. He can take the lead in stimulating basic understanding and support of the planning and management system. The institutional researcher, more than anyone else at the institution, is in a position to understand the basic concepts of planning and management systems and their complexities. It is important that he relate these concepts to his institution and share this knowledge with others in the university community in clear and understandable terms.

Planning and management systems in institutions of higher education should be implemented to facilitate the principal function of the institution, learning. While it may appear that management efficiency is the primary reason for implementing planning and management systems, efficiency is only one aspect of a more important objective, that of educational effectiveness. Long-range planning provides a logical and rational problem-solving approach to the development of academic

programs in an institutional setting.[4] It is more important that we know what to plan for than it is to know how to plan. Institutional research, then, plays a pivotal role between faculty concerns for educational effectiveness and administrative concerns for management efficiency.

Institutional researchers can also play an important role in stimulating participation of those in the academic community. The problems we have today are problems that must be faced by all, and all must contribute to their solution. The task of gaining consensus on overall goals and objectives of the institution will be difficult at best. The institutional researcher can assist in this process by applying his knowledge of management systems and planning techniques to the development of meaningful and acceptable models of community participation in the planning process. The institutional researcher can also work to reconcile differences when they arise between key administrative units of the institution.

Institutional research plays a major role in improving the systems of information and communication. Subjective and objective data on the institution must be gathered, analyzed, and evaluated and then shared with members of the institutional community. Institutional research must also bear

the burden of gathering information on new management systems and planning techniques that might be applicable to the institution.

The institutional researcher also plays a key role in the relationship between the institution and its external constituencies. As mentioned earlier, the institutional researcher has a direct and most important relationship with persons in the statewide system. Institutional researchers also relate to the general public, often indirectly through the public affairs operation of the institution, as well as through educational agencies on the state and national level.

Leadership is most effective when it is based on expertise and personal liking.[5] Persons engaged in institutional research must take a leadership role both personally and professionally in encouraging acceptance of and stimulating support for the long-range planning process. Institutional researchers can exert positive influence by virtue of their professional knowledge and their personal relationships. The planning process, once implemented, will prove to be no panacea to the problems we now face in higher education. Rather, it could lead to increased competition and conflict among constituencies within the institution. However, such competition and

conflict, given the additional and relevant information provided in the planning process, can be managed more reasonably and rationally than has been the case in the past. I view as one of the major functions of the institutional researcher that of being sensitive to the concerns of the various institutional constituencies and providing the necessary information relating to those concerns.

A Final Plea for Planning

Many are critical of higher education today and question its relevance in contemporary society. However, most recognize the value of post-secondary education and its potential value to the individual and society. I regard today's criticism as being more constructive than destructive. Many aspects of society are changing rapidly, and higher education itself must change if it is to survive. The need for planning and coordination in higher education is obvious. Institutions must avoid duplication and wasteful competition and make more efficient and effective use of available resources. There is also an urgent need for objective analyses of academic programs and their potential benefit and value to the student and society. Careful planning and the involvement of the various constituencies

on and off the campus in this process can assist individual institutions as well as the entire system of higher education in meeting and overcoming the critical financial and organizational problems we are facing today and provide the educational experiences that will benefit the individual and the society.

FOOTNOTES

1. John W. Gardner, The Recovery of Confidence, (New York: W. W. Nortin & Co., Inc., 1970, p.93.

2. Carnegie Commission on Higher Education, The More Effective Use of Resources, (New York: McGraw-Hill Book Co., 1972), p.1.

3. Thomas Mason, "Developing and Using Information Systems," Institutional Research in the University: A Handbook, Paul L. Dressel and Associates, (San Francisco: Jossey-Bass Inc., 1971), p.173.

4. Cameron Fincher, "Planning Models and Paradigms in Higher Education," Journal of Higher Education, December, 1972, p.756.

5. Daniel Katz and Robert L. Kahn, The Social Psychology of Organizations, (New York: John Wiley & Sons, Inc., 1966), p.458.

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STATEWIDE ENROLLMENT ANALYSIS AND INSTITUTIONAL IMPLICATIONS FOR TOTAL ENROLLMENTS AND PROGRAM ENROLLMENTS

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for the

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on

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STATEWIDE ENROLLMENT ANALYSIS AND INSTITUTIONAL IMPLICATIONS FOR TOTAL ENROLLMENTS AND PROGRAM ENROLLMENTS

Introduction

Since 1965, the State Council of Higher Education has been, primarily in cooperation with the state-supported institutions but also private institutions, involved in projecting the enrollments for higher education in Virginia. In this phase of its work, it has been concerned with statewide projections but also has been increasingly involved in assisting institutions in developing estimates of their future share of the student population. These institutional estimates, after review, evaluation, and possible modification in cooperation with each college or university, are utilized in three interrelated aspects of higher education in Virginia:

(1) For statewide master planning of all higher education;

(2) As a basis for determining operating budget requirements for state-supported higher education; and

(3) As a basis for determining capital outlay budget requirements for state-supported higher education.

In the latter two of the above, the State Council informs the Governor's Office of its recommendations on a particular institutions's enrollment projections. Those recommendations are considered in the development of the Executive Budget. In addition, the State Council would utilize institutional projections which it had endorsed in developing its own budget recommendations to the Governor and State Legislature. Historically, the State Council and each institution have been able to reach agreement on projections.

It seems clear that the task of enrollment projections, at both the state and institutional level in Virginia, will become more demanding in the immediate and forseeable future. No longer will it be a matter of providing spaces for students in ever-increasing numbers, a situation in which projections can be self-fulfilling. In the last two academic years, 1971-72, and 1972-73, a number of Virginia institutions of almost all types have sustained losses in enrollment. This has included community colleges, liberal arts colleges, and comprehensive colleges. Not only are college and university administrators concerned

about stabilized and declining enrollments and their effects, but governors, state government officials, and legislators are increasingly concerned about budgets which are built upon enrollments which do not materialize.

I. Enrollment Projecting at the State Level

In October of 1972, the National Center for Higher Education Management Systems at the Western Interstate Commission of Higher Education (WICHE) published a report of a survey of current enrollment forecasting practices of State Higher Education Agencies. The survey solicited data on the forecasting method used in each state, classified them into four methods, and found the following:

Method	Number of States Using
Projected high school graduates and their postsecondary education participation rates, ratio, class succession, cohort survival	18
Used gross population or 18-24 years old population or correlation with college-age population as projection basis	3
Used regression or multiple regression technique over time	2
Used combinations of more than one technique and model of system	14

In addition, the survey collected information on the time frame to which the forecasting method was applied, summarized these into four periods, and found the following:

Time Frame Forecasting Used For	Number of States Using
Long-range only (10 or more years in future)	5
Short (1 to 2 years) and medium (3 to 9 years) range	12
Short, medium, and long-range	19
Others	8

In Virginia, our experience and practice, which will subsequently be discussed, would indicate that a cross-tabulation between the forecasting method used, and the time frame for which it was used, might have indicated a degree of correlation between a particular method and a certain time frame. In Virginia, for example, the State Council utilizes population data as a basis for what we define as medium-range projections, and college cohort survival techniques for what we define as short-range projections.

II. Enrollment Projecting at the State Level in Virginia

In discussing the way in which the State Council approaches the projecting of higher education enrollment in Virginia, it is helpful to set the following dichotomy:

1. Statewide Projections
   - A. Short-range (1 to 3 years)
   - B. Medium-range (4 to 10 years)
2. Individual Institutional Projections
   - A. Short-range (1 to 3 years)
   - B. Medium-range (4 to 10 years)

Statewide Projections

In its most recent effort to develop statewide enrollment projections, the State Council began in early 1971 to develop statewide enrollment projections for the period 1972-1982. In addition to the Council and its staff, the major participants in the development of statewide enrollment projections included professional demographers, individuals from other states who had experience in developing projections, a working committee of representatives of state-supported institutions, and representatives of the private college sector in Virginia.

The method used to develop statewide enrollment projections was the so-called ratio technique which assumes that a relationship exists between the number of students enrolled in college and a specified college age population. The relationships usually used are to the 18-21 and 18-24 years old population. In order to develop an accurate basis for enrollment projections, two types of information are required: (1) historical and projected State population figures for 18-21 and 18-24 year olds, and (2) enrollment

figures for each college or group of colleges (such as two- and four-year). The total enrollment of a college or groups of colleges for a number of past years is divided by the population base for the corresponding year to obtain a series of college attendance rates. These rates or ratios are analyzed and a decision is made as to those that are to be used in the forecast. A trend line is calculated and projected, and an appropriate ratio is obtained by each year of the forecast period. After establishing future ratios and future college age population pools as concisely as possible, future enrollments are estimated by multiplying the appropriate ratio times the corresponding college age population pool for each year within the forecast period. The wide acceptability of the ratio-to-population method is due in part to the simplicity of the computational techniques characteristic of the method, its capability of developing projections even when very detailed data are incomplete or not available, and its specific adaptability to providing estimates of total enrollments by groups of colleges. One important source of information is the calculated historical ratios. As in any method of projection, assumptions must be made in applying the ratio method. Assumptions concerning possible modifications to the factors, or new factors which may operate, may be introduced to adjust the ratios. The ratio trend would therefore take into account increases or decreases in the ratios, and project these increases or decreases into the future.

In addition to those cited above (simplicity of application, availability of data, and specific adaptability to estimating statewide or total enrollments), there were several other basic reasons for utilizing the ratio technique in arriving at statewide projections. Virginia has historically ranked low in terms of the college attendance rates of its population. Therefore, it was felt important to emphasize, particularly for medium-range projections, the potential college enrollments toward which the state should strive in providing higher education opportunity. In addition, there were two related and limiting factors in using the other commonly accepted method of projecting higher education enrollment on a statewide basis. The first limitation was that sound or detailed data on projected high school graduates was not available. Secondly, current trends indicate that: (1) college attendance does not, to the same extent as previously, follow immediately after high school graduation; and (2) the college participation of older age groups is increasing. There are other related reasons for the use of the ratio technique, but it was the judgment of the State Council that high school graduate data was not the most appropriate basis for projecting college enrollment in Virginia.

Basic to the use of the ratio technique are reliable projections of the college age populations, usually 18-21 year olds and 18-24 year olds. The State Council contracted with the Bureau of Population and Economic Research of the University of Virginia, to develop estimates of future college age populations based on data supplied by the 1970 Census of Population. These projections were not only developed and made available on a statewide basis, but also on a district-by-district basis within the state. The significance of the population estimates by district to the overall approach utilized in Virginia will become evident in discussing the development of institutional projections.

The development of the State Council's enrollment projections, utilized as a basis the projections of the 18-21 and 18-24 years old population. As is the case in any projection into the future, a number of assumptions were made in moving from the projections of college age population to projections of higher education enrollment in Virginia. Two different sets of assumptions were made as to future conditions relative to higher education enrollment in Virginia; and on the basis of each of these, two different series of statewide projections were developed. This resulted in a range for all but the first three years of the projection period. Once the two series of projections for Virginia residents attending college had been made, it was necessary within each series to distribute those students to the various segments which provide them with higher education services. It was necessary to estimate those going out-of-state to college, those attending private Virginia institutions, and those attending Virginia's state-controlled colleges and universitites. In arriving at such estimates, assumptions were made relative to out-of-state migration of students and Virginia residents attending private colleges.

Although projections for the entire ten-year projection period were developed utilizing the ratio technique discussed, the short-range statewide projections for state-supported institutions during the first three years were reviewed and modified based on the total of the enrollments for all institutions. In its review and evaluation of each institution's projections for the first three years of the projection period, the Council utilized a somewhat different approach which will be discussed in the next section.

Institutional Projections

Following development and agreement on statewide enrollment projections, each institution was asked to develop and submit its individual projection for the period, 1972-1982, to the State Council.

In developing its short-range projections, each institution was asked to place particular emphasis on its most recent experience in admissions and enrollment, and also to cohort-survive classes and expected classes through each undergraduate level on the basis of the most recent attrition rates.

To assess its medium-range projections for 4 to 10 years into the future, each institution was provided with data on the statewide enrollment projections, the districts from which each institution historically had drawn its in-state enrollment, the projected 18-21 and 18-24 years old population within each of those districts, and published information on possible approaches to institutional enrollment projecting.

After each institution had submitted a preliminary set of projections, these were reviewed and evaluated by the State Council staff. In reviewing the projections, the staff utilized basically the same approaches it had recommended to each institution. Short-range projections were reviewed using recent experience in admissions and enrollment, and results of the cohort-survival technique as applied to the colleges' classes or expected classes for the next three years. This technique, however was applied only to undergraduate enrollment and also had limited applicability to two-year community college enrollments.

The cohort-survival technique provided estimates of the size of the freshman, sophomore, junior, and senior classes. The term "cohort" refers to the classification of a group of individuals as to some common trait, and in the case of enrollment projections defines a particular group of students. As applied in the State Council's approach, the cohort-survival technique involved an analysis of the extent to which a group of individuals, termed a "cohort," survived from the entering class through the various class levels to become seniors in a college or university. A series of survival ratios are set up between the enrollment at each level for a particular year and the enrollment at the next level for the following year. For example, the survival ratio from the sophomore to the junior level would be determined by dividing the number of persons in the junior level for any given year by the enrollment in the sophomore level the previous year. Thus, in actuality this technique serves to survive a particular cohort for a given year through the various levels to senior status.

The medium-range projections of each institution were reviewed in a different manner which to a degree, and for many of the same reasons, paralleled the approach taken in developing medium-range statewide projections. The approach utilized might be termed a "market potential" approach. Based on the projected population in the in-state districts from which each institution historically had drawn its students, a reasonable expectation of the college-

going rate in those districts, other higher education institutional (present and projected) development in those areas, and other factors, an evaluation of each college's or university's potential enrollment was made. This evaluation was utilized in reviewing each institution's own projections as submitted. In addition, the pattern of enrollment growth projected by each institution for itself was compared to the growth rate of either the four-year or two-year segments, as appropriate.

After completing its review and evaluation of each institution's projected enrollment growth, members of the State Council staff visited each institution to present that evaluation and discuss it with institutional representatives. The final result of the process and negotiations which that visitation initiated was the State Council's endorsement of a ten-year projection for each state-supported institution in Virginia.

III. Institutional Reassessment of Enrollment Projections

A formal reassessment of each institution's enrollment projection is undertaken every two years by the State Council. This reassessment is done in concert with the institution and may occur more often if circumstances demand. Present plans are for the statewide master plan for all higher education in Virginia to be formally reviewed for possible revision on at least a biennial basis, and the biennial budgeting period will continue to require that enrollment estimates for budget purposes be reevaluated every two years.

It is the position of the State Council that the institution's enrollment plans and those at the State level must be one and the same. Any other arrangement would make statewide coordination of enrollment plans a meaningless exercise. Each institution is always free, however, to propose a change in its plans to the State Council. Consideration of the change by the State Council and the institution would attempt to evaluate all of the factors involved. This would include possible changes in admissions policies, the addition of new academic programs, the deletion of existing academic programs, revisions to academic programs or curricula, and the ability of the institution to attract students from areas or age groups not presently represented in its constituency.

IV. Implications for Total Enrollments and Program Enrollments

Many institutions, such as the University of Virginia, are in the fortunate position of not facing an immediate prospect of total declining enrollments because of the large number of applicants for admission at the undergraduate level. However, stabilizing and/or declining graduate enrollments exist. As a consequence, the problem is one of projecting the graduate enrollment and setting a reasonable limit on the undergraduate admissions which will not overburden the physical facilities, faculty, dining facilities, and the like. The problem of fitting the University of Virginia's enrollment projections to the State-wide enrollment projections is primarily one of predicting a desirable in-state/out-of-state ratio. Since the University of Virginia attracts a large number of students from states other than Virginia the state-wide approach is not totally applicable. Thus, the specific approach for meaningful enrollment projections at the University of Virginia may be outlined as follows:

a) Project in consultation with the Deans of the Schools of Law and Medicine their anticipated enrollment for the next ten years. These Schools were treated individually because they are overwhelmed with applicants and their enrollment is limited by the number of faculty and amount of physical facilities available.

b) Establish in discussions with the Dean of the Graduate School of Arts and Sciences enrollment trend lines for each department for the next ten years--this is the most difficult and inaccurate of the projections, in my opinion. Changes are transpiring so rapidly that it is impossible to predict accurately.

c) The Graduate Schools of Business Administration, Education, and Architecture enrollment projections were modified slightly in view of the fall 1972 enrollment experience. The graduate program in the School of Engineering was projected to decline in the ensuing ten year period. This decline was projected in light of the decline in Engineering enrollment experienced at the University as well as nationwide.

d) The University's enrollment projections were studied in detail last year by an academic committee which carefully examined the problem of enrollment projections. Its conclusion was that the University should limit the total enrollment to 15,000 by 1976, and 16,000 by 1980. The committee concluded after lengthy study that these enrollments were the maximum enrollments which could be accomodated within the limits of existing physical facilities and projected staff. Once these goals were established, the committee made projections for the individual schools of the University. These projections were based upon available space, academic goals of the individual schools, and an adaptation of the "ratio technique" and "cohort survival" techniques. These projections were modified slightly during the fall 1972 in light of the 1972 enrollment experience and were used as the basis of the undergraduate enrollment projections for the University.

As indicated, population projections by district had little bearing on the University of Virginia enrollment projections.

Clinch Valley College

The enrollment situation was quite different at Clinch Valley College--a branch of the University of Virginia in the Applachian Region of the State. Clinch Valley College had experienced a decline in enrollment and anticipated no significant increase in its applicant pool for next fall. Clinch Valley serves primarily a local region comprising seven counties (Planning Districts 1 and 2) in the southwestern region of the State. These counties are experiencing a significant out-migration of population, and consequently, a decline in the 18-21 year old population by 1982. A new community college located 25 miles from Clinch Valley College also opened this past fall. Moreover, compounding the problem, Clinch Valley is situated in a very mountainous region and it is probably reaching a maximum number of commuter students. Thus, its ability to attract more students depends upon the completion of additional dormitory units.

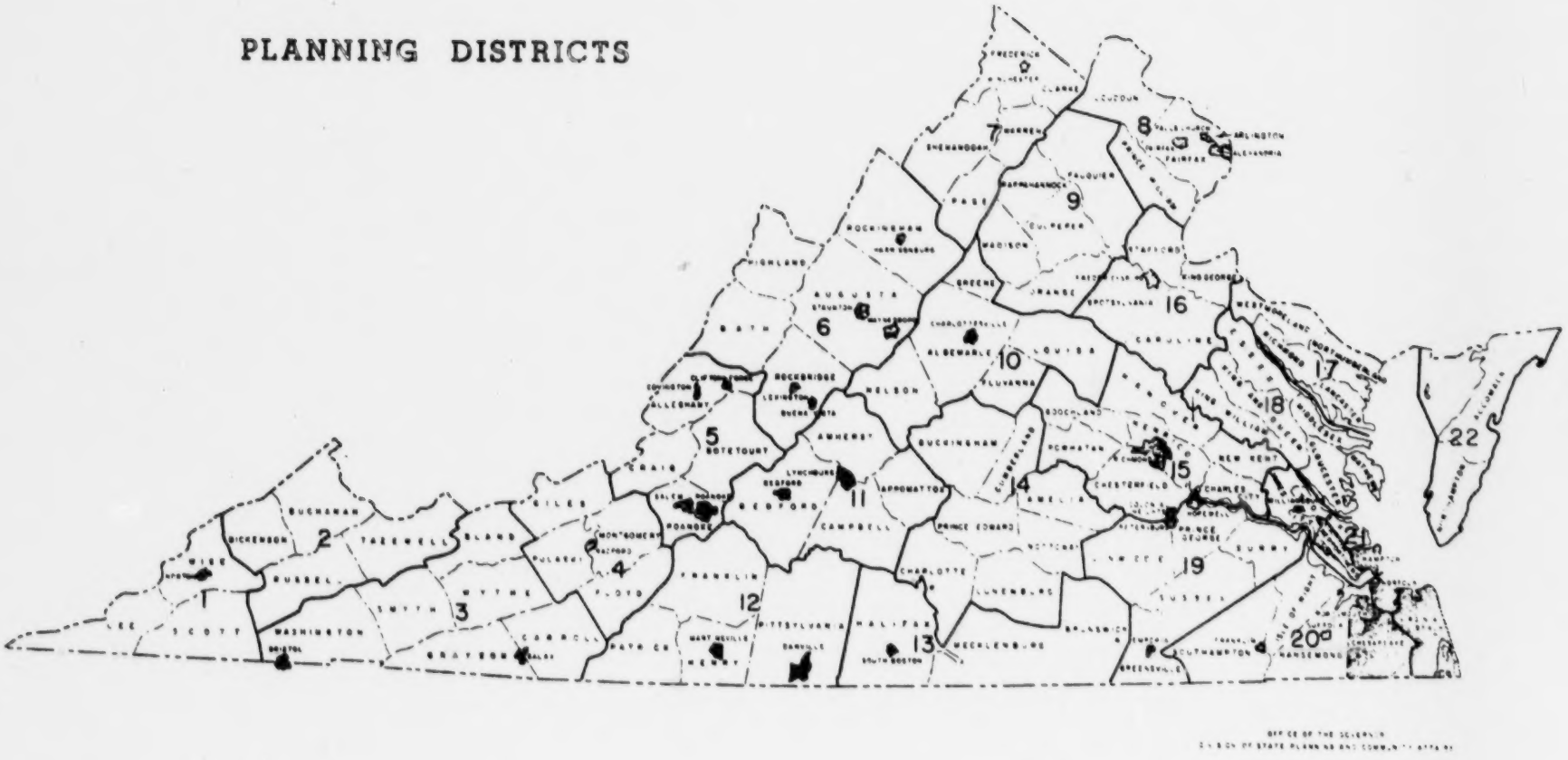
Enrollment projections were concluded after a very careful study was made of a) the cohort survival projections, b) an analysis of potential applicants based upon a ratio technique applied to the 18-21 year old population in the planning districts served by Clinch Valley, and c) a judgment was made concerning the percentage of 18-21 year old population in the planning districts anticipated to attend Clinch Valley College through 1982. To give an idea of the impact of the aforementioned factors, Clinch Valley College had projected an enrollment of 1,600 for 1980 two years ago (March 30, 1971); the revised projection is 1,088 by 1980.

The primary area of discussion between the State Council of Higher Education and representatives of Clinch Valley College concerned projections of the percentage of the 18-21 year old population from planning districts 1, 2, and 3 anticipated to attend Clinch Valley College. These districts have had a relatively low percentage of 18-21 year olds attending college in the past; it is Clinch Valley's desire and goal to raise this percentage if at all possible.

As can be imagined, the impacts of declining or stabilizing enrollments will be enormous on colleges such as Clinch Valley College. The stabilized or declining enrollments coupled with state budget formulae based primarily on enrollment have immediate impact on state funds available in succeeding biennia. Clearly, the number of additional faculty positions authorized by the state will be reduced significantly; moreover, the reduction in the number of faculty positions is forcing a review of the number of tenure positions available to each department as well as the number of new positions (if any) to be allocated to each department.

Since the state has established guidelines for new capital outlay closely related to enrollment projections, stabilized enrollments have already resulted in decisions which have eliminated plans (some made 8 to 10 years ago) to build certain academic buildings.

PLANNING DISTRICTS



Attachment 1

Attachment 2

Population Aged 18-24, Virginia Planning Districts, 1970-1985

(in thousands)

District	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	8.7	9.5	10.2	10.8	11.3	11.7	11.9	11.8	11.4	10.9	10.5	10.0	9.6	9.1	8.6	8.2
2	12.3	13.3	14.3	15.1	15.9	16.5	17.0	17.0	16.6	16.1	15.6	15.0	14.4	13.7	13.1	12.4
3	17.3	18.4	19.3	20.1	21.0	21.4	21.3	21.1	20.8	20.5	20.1	19.6	19.4	18.9	18.6	18.1
4*	20.3*	20.1*	18.9*	18.6*	18.4*	16.7*	14.7*	13.2	13.2	13.2	13.2	13.1	13.2	13.3	13.5	13.5
5	25.3	26.2	26.8	27.4	28.5	29.4	30.0	30.4	30.6	30.7	30.6	30.4	30.2	29.9	29.5	28.8
6*	22.1*	23.2*	24.2*	25.1*	25.4*	25.6*	25.2*	25.0	25.2	25.2	25.3	25.4	25.3	25.0	24.5	23.8
7	10.8	11.3	11.8	12.2	12.9	13.5	13.9	14.2	14.4	14.4	14.6	14.7	14.6	14.6	14.3	13.9
8	114.1	112.5	110.9	109.7	113.5	119.8	128.2	136.1	141.9	146.5	151.2	155.4	158.3	160.2	161.0	160.8
9	7.2	7.6	7.9	8.3	8.8	9.4	10.0	10.4	10.5	10.6	10.6	10.5	10.5	10.3	10.1	9.8
10*	12.9*	13.2*	13.3*	13.6*	13.8*	14.2*	14.5*	14.9	15.2	15.5	15.6	15.6	15.6	15.6	15.3	14.9
11*	17.6*	18.5*	19.4*	20.2*	21.1*	21.9*	22.5*	22.7	23.0	23.3	23.3	23.2	23.0	22.7	22.2	21.5
12	24.4	25.6	26.7	27.8	29.2	30.0	30.6	30.7	30.7	30.6	30.3	29.9	29.5	29.0	28.1	27.2
13	8.5	9.3	10.1	10.8	11.5	12.1	12.5	12.6	12.5	12.1	11.8	11.3	11.0	10.6	10.2	9.6
14	9.0	9.7	10.3	10.9	11.3	11.3	11.3	11.0	11.0	11.0	10.8	10.6	10.4	10.3	10.0	9.7
15*	62.2*	63.4*	64.8*	66.4*	68.7*	71.0*	73.3*	75.4	77.0	77.8	78.2	78.4	78.7	78.4	77.3	75.8
16*	10.7*	10.8*	10.7*	10.8*	10.8*	10.8*	10.7*	10.6	10.8	10.9	11.0	11.1	11.1	11.1	11.1	10.9
17	2.9	3.3	3.7	4.1	4.4	4.8	5.1	5.3	5.2	5.2	5.0	4.9	4.8	4.6	4.3	4.0
18	4.2	4.7	4.9	5.3	5.8	6.1	6.5	6.8	6.7	6.7	6.6	6.5	6.5	6.4	6.2	6.1
19*	17.8*	18.5*	19.2*	20.1*	20.7*	21.0*	21.7*	22.7*	23.1	23.2	23.1	23.1	23.1	22.9	22.6	22.1
20*	101.1*	101.1*	100.7*	99.9*	98.7*	98.3*	99.8*	103.4	104.9	105.8	106.4	106.5	105.7	104.0	101.3	98.0
21*	48.4*	48.0*	47.3*	46.8*	45.6*	44.3*	44.6*	45.6	47.2	48.9	50.0	51.1	51.6	51.8	51.3	50.5
22	3.5	3.9	4.4	4.8	5.2	5.6	6.0	6.1	6.1	5.9	5.8	5.6	5.3	5.1	4.8	4.6
State	561.4*	572.4*	579.7*	588.6*	602.4*	615.6*	631.4*	647.0*	658.0	664.8	669.1	672.0	671.6	667.6	657.7	644.2

* correction made for out-of-state military and/or college populations

STUDENT POPULATION BY PLANNING DISTRICT, FALL 1970

	1	2	3	4	5	6	7	8	9	10	11	12
4-Yr. Col. & Univ.:												
C. Newport of Wm. & Mary	--	--	--	--	---	--	--	1	--	--	3	--
Cl. Valley of U. Va.	584	168	17	--	--	1	--	1	--	--	--	5
George Mason of U. Va.	--	1	--	--	--	--	1	2,340	5	--	--	--
Longwood	3	11	14	23	127	66	31	156	30	73	108	89
Madison	5	11	27	36	133	962	278	849	63	104	94	54
Mary Washington of U. Va.	1	2	18	5	36	36	17	475	45	60	45	33
Norfolk State	--	--	2	2	33	6	--	19	1	20	31	107
Old Dominion U.	1	1	3	5	37	28	12	601	13	29	25	19
Radford	51	115	280	701	399	177	57	614	32	48	129	217
U. Va.	30	32	66	37	255	290	70	1,783	121	1,338	226	159
VCU	27	41	69	51	183	187	133	1,276	89	130	112	156
VMI	1	2	15	8	46	42	16	131	12	10	34	11
VPI & SU	114	149	394	1,161	772	473	194	2,283	138	155	349	445
Virginia State	3	5	6	7	44	13	9	49	26	46	39	138
William and Mary	8	9	15	25	91	86	48	746	31	53	74	56
All 4-Yr. Col. & Univ.	828	547	926	2,061	2,156	2,367	866	11,324	606	2,066	1,269	1,489
2-Yr. Branch Col.:												
E. Shore of U. Va.	--	--	--	--	--	1	1	7	--	--	--	--
Pat. Henry of U. Va.	--	--	--	--	2	--	--	--	--	--	--	339
R. Bland of Wm. & Mary	--	2	1	2	2	4	1	17	--	1	--	4
All 2-Yr. Branch Col.	--	2	1	2	4	5	2	24	--	1	--	343
Community Col.:												
Blue Ridge	--	1	--	--	7	1,146	67	3	2	51	--	--
Central Virginia	1	1	--	--	2	2	--	2	--	26	1,554	35
Dabney S. Lancaster	--	1	--	--	429	111	--	4	2	1	1	--
Danville	2	2	9	13	2	5	1	7	1	2	6	1,266
Germanna	--	--	--	--	--	--	--	3	118	6	1	--
John Tyler	--	2	2	--	4	5	--	4	2	10	2	2
Lord Fairfax	--	--	--	--	--	--	541	3	26	1	--	--
New River	--	--	45	582	2	--	--	1	--	--	--	6
Northern Virginia	--	16	30	16	14	26	17	8,970	66	28	56	30
Southside Virginia	--	--	--	--	--	--	--	--	--	--	--	--
Southwest Virginia	17	871	5	--	--	--	--	--	--	--	--	--
Thomas Nelson	--	--	1	3	1	1	--	2	1	1	--	2
Tidewater	--	1	--	--	1	1	--	4	--	--	1	1
Virginia Highlands	35	17	503	--	--	--	--	--	--	--	--	--
Virginia Western	--	12	8	117	2,380	43	1	--	1	1	56	135
Wytheville	5	3	761	118	8	2	2	--	--	--	2	3
All Community Colleges	60	927	1,364	849	2,850	1,342	629	9,003	219	127	1,679	1,480
All Institutions	888	1,476	2,291	2,912	5,010	3,714	1,497	20,351	825	2,194	2,948	3,312

Attachment 3

STUDENT POPULATION BY PLANNING DISTRICT, FALL 1970 (Continued)

	13	14	15	16	17	18	19	20	21	22	In-State	Out-of-State[a]	Total
4-Yr. Col. & Univ.:													
C. Newport of Wm. & Mary	--	--	3	--	--	31	3	39	1,621	--	1,701	69	1,770
Cl. Valley of U. Va.	--	1	1	--	--	--	--	2	--	--	780	32	812
George Mason of U. Va.	--	--	--	--	--	--	--	--	--	--	2,347	43	2,390
Longwood	98	216	406	36	23	20	118	311	122	27	2,108	126	2,234
Madison	20	19	211	45	23	19	58	192	113	22	3,338	703	4,041
Mary Washington of U. Va.	13	14	232	138	32	15	29	139	71	7	1,463	691	2,154
Norfolk State	62	32	141	21	9	67	126	3,586	487	76	4,828	76	4,904
Old Dominion U.	23	14	157	17	22	36	49	6,620	759	38	8,509	962	9,471
Radford	45	50	210	27	11	13	49	213	103	12	3,553	606	4,159
U. Va.	53	48	759	97	29	33	114	567	286	26	6,419	4,433	10,852
VCU	91	130	8,236	215	114	91	491	447	275	38	12,582	1,506	14,088
VMI	6	11	104	14	4	--	19	74	37	4	601	530	1,131
VPI & SU	105	132	872	100	40	68	234	794	512	46	9,530	2,513	12,043
Virginia State	124	113	501	58	54	70	600	302	171	42	2,420	528	2,948
William and Mary	24	19	364	30	29	104	151	405	1,689	16	4,073	1,246	5,319
All 4-Yr. Col. & Univ.	664	799	12,197	798	390	567	2,041	13,691	6,246	354	64,252	14,064	78,316
2-Yr. Branch Col.:													
E. Shore of U. Va.	--	--	5	2	--	1	--	5	1	67	90	29	119
Pat. Henry of U. Va.	--	--	--	--	--	--	--	--	--	--	341	12	353
R. Bland of Wm. & Mary	6	4	48	1	5	--	671	5	5	--	779	62	841
All 2-Yr. Branch Col.	6	4	53	3	5	1	671	10	6	67	1,210	103	1,313
Community Col.:													
Blue Ridge	--	1	5	--	1	--	--	2	--	1	1,287	28	1,315
Central Virginia	9	21	1	--	--	--	--	1	--	2	1,657	27	1,684
Dabney S. Lancaster	--	--	--	--	--	--	--	1	--	--	550	18	568
Danville	211	35	13	6	2	4	12	12	4	4	1,619	49	1,668
Germanna	--	--	1	242	2	--	--	--	--	--	373	10	383
John Tyler	5	49	1,048	2	14	4	653	2	9	2	1,821	35	1,856
Lord Fairfax	--	--	--	--	--	--	--	--	--	--	571	--	571
New River	--	--	--	--	--	--	1	--	--	--	637	--	637
Northern Virginia	3	14	38	61	9	14	9	18	5	8	9,448	270	9,718
Southside Virginia	159	64	1	--	--	--	21	1	--	--	246	--	246
Southwest Virginia	--	--	--	--	--	1	--	--	--	--	894	21	915
Thomas Nelson	--	--	--	--	--	35	--	22	2,088	1	2,158	57	2,215
Tidewater	1	--	--	--	1	2	3	1,827	3	1	1,847	8	1,855
Virginia Highlands	--	--	--	--	1	--	--	1	--	--	557	10	567
Virginia Western	8	--	7	2	--	1	4	7	1	--	2,784	24	2,808
Wytheville	--	--	4	--	2	--	--	4	2	--	916	16	932
All Community Colleges	396	184	1,118	313	32	61	703	1,898	2,112	19	27,365	573	27,938
All Institutions	1,066	987	13,368	1,114	427	629	3,415	15,599	8,364	440	92,827	14,740	107,567

[a]The total for out-of-state students is more than figures previously published by the State Council. Apparently a number of students and/or their families had located in Virginia but had not established the necessary residency requirements in order to qualify for in-state tuition fees.

Attachment 3 (continued)

Institution _____

Head-Count Enrollment Progression Rates By Undergraduate Class Level

	Fall 1968	Fall 1969	Fall 1970	Fall 1971	Fall 1972	Fall 1973	Fall 1974	Fall 1975
First-Time Freshmen								
Transfer Freshmen								
Repeating Freshmen								
Total Freshmen								
Transfer Sophomores								
Other Sophomores								
Total Sophomores								
Transfer Juniors								
Other Juniors								
Total Juniors								
Transfer Seniors								
Other Seniors								
Total Seniors								
Unclassified								
Grand Total								

Attachment 4

1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980

HIGHER EDUCATION ENROLLMENT AND PROJECTED ENROLLMENT 1960 - 1982

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
10th Floor, Life of Virginia Building, 911 East Broad Street
Richmond, Virginia 23219
October, 1972

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HIGHER EDUCATION ENROLLMENT
AND
PROJECTED ENROLLMENT

1960 - 1982

INTRODUCTION

The statewide higher education enrollment projections presented in this document are advanced as planning guidelines based on the State Council's best estimate of future trends and conditions. Planning is a continuous process and enrollment projections will require periodic review and updating as each year new social and demographic changes require additional study. It should also be understood that these projections are enrollment trends and should be considered as such rather than being construed as actual absolute numbers.

The projections presented in this document represent an updating of the statewide enrollment projections made in 1965 by the Higher Education Study Commission, and also those incorporated in The Virginia Plan for Higher Education, published by the State Council in December, 1967. The Higher Education Study Commission presented four series of enrollment projections in its 1965 Staff Report #2, Statewide Pattern of Higher Education in Virginia, with Series 4 being the most optimistic. The enrollments reached in 1970 slightly exceeded those predicted by the Series 4 enrollment projections.

The Virginia Plan presented statewide enrollment projections for 1972 consistent with Series 4 of the Study Commission. Whereas the statewide totals for all sectors have proven to be extremely accurate for the 1967-72 period, when the projections presented in The Virginia Plan are categorized into state-controlled four-year, state-controlled two-year, and private college enrollments, three noteworthy trends are apparent. The four-year state-controlled segment has not achieved the enrollment growth predicted. The two-year public segment has, however, more than made up the difference, growing at a much faster rate than predicted. The result has been that, to date, the state-controlled institutions have exceeded the enrollments projected by The Virginia Plan by about 5 percent. The private colleges and universities in Virginia, however, will reach an enrollment by Fall 1972 which is about 6,000 students, or 18 percent, below that originally predicted in 1967.

In addition, it should be noted that data from the 1970 Census indicate that the original projections of the Higher Education Study Commission for 18-21 year-old population for the late 1970's and 1980 were approximately 7 percent lower than is now projected based on the more recent data. Since the population base used to project enrollments is now known to be larger, it is to be expected that the enrollments now projected for the late 1970's will be greater than those originally set forth.

DEVELOPMENT OF THE PROJECTIONS

A series of three projections are presented in the following pages. Two of these are based on differing sets of assumptions. The third projects Virginia's achieving the national level of the college-going rates of its citizens by the 1980's. This third series is presented as a goal statement for Virginia and projects the higher education opportunities required if Virginia were to achieve parity with what is projected for the entire nation within the time frame being considered.

The basic data utilized to project college enrollment were 18-21 and 18-24 year-old populations for Virginia. Projections of these population groups were developed from the second count of the 1970 Census.

The relationship between total enrollment and the 18-21 and 18-24 year-old population was utilized to project college enrollment in Virginia. This is an accepted technique where age distribution of college enrollment is not precisely known. This technique recognizes that a wide range of ages is represented in student population and that college enrollment consists of more than just those whose ages fall between 18 to 21 or even 18 to 24. The term "college age" is difficult to define and to be inclusive would include all individuals over the age of 17. Nevertheless, a majority of college students come from the 18-21 age group--approximately 60 percent in 1970, according to the Department of Commerce. That Agency also estimated that 78 percent of college enrollment in the United States was made up of 18 to 24 year olds in 1970. Accordingly, the 18-21 and 18-24 year-old age groups have been used to represent the "pool" of individuals from which the colleges will draw their students. Despite objections which may logically be made to the use of these groups in studies of college enrollment, they provide a satisfactory base for most such studies. To extend the age limits of the base group would mean the inclusion of population strata of which only a small portion attend college. For example, the group aged 22-24 accounted for over 18 percent of college students in 1970, but only 13 percent of the individuals aged 22-24 were in college during the same year. The evidence does, however, indicate that the participation of older age groups in college is increasing. For this reason, projections for certain future years have been made based on population projections and college-going rates for four separate age groups between the ages of 18 and 34. Projected college-going rates for each of these Virginia age groups were based on national estimates. The enrollment projections developed by this second method can be compared to estimates for the same years using only the 18-21 and 18-24 year-old age groups as population pools. Comparisons indicate that both methods yield essentially the same results.

ASSUMPTIONS UPON WHICH PROJECTIONS ARE BASED

The general assumptions made in each of the first two sets of projections are as follows:

Series 1 Projections--This series assumes that between 1970 and 1980 the college-age population enrolled in college will increase at an average annual rate equal to 75 percent of the rate experienced between 1960 and 1970. It further assumes that the major portion of the increase (89 percent) in the college-going rate will be experienced between 1970 and 1976, after which it will increase but at a decreasing rate. Enrollment of Virginia residents in higher education would increase by 32.2 percent from 1972 to 1982 under this series. The more specific assumptions which underlie this general assumption are detailed on pages 10 and 11 of this report. The reader is encouraged to refer to these for a more complete description of the basis upon which the projections were made.

Series 2 Projections--This series assumes that between 1970 and 1980 the percentage of Virginia's college-age population enrolled in college will increase at an average annual rate equal to 95 percent of the rate experienced between 1960 and 1970. It further assumes that the major portion of the increase (84 percent) in the college-going rate will be experienced between 1970 and 1976, after which it will increase but at a decreasing rate. Enrollment of Virginia residents in higher education would increase by 42.1 percent from 1972 to 1982 under this series. The more specific assumptions which underlie this general assumption are detailed on page 12 of this report. The reader is encouraged to refer to these for a more complete description of the basis upon which the projections were made.

Goal Projections (Series 3)--Goal projections are presented as a definition of the enrollments which would occur if Virginia were to reach parity with projected national college-going rates by the 1980's. Goal projections are presented for certain selected years only, and have been developed solely from national rates applied to Virginia's college-age population. Virginia has consistently lagged behind the national average in its college-going rate. Three significant factors related to this lag have been that the tuition structure in Virginia is among the highest in the region and the nation; Virginia provides only a limited amount of student financial aid for those students from low income families; and the holding power of Virginia's secondary schools has not equaled the national level. Despite the fact that higher education in Virginia experienced previously unparalleled growth during the decade of the Sixties, in 1970 Virginia was still well behind the nation in its college-going rate. No specific assumptions are presented for these goal projections. In light of Virginia's

present position, it would be necessary to significantly ameliorate the conditions mentioned previously and to make an increased statewide commitment of resources if this goal were to be achieved.

PROJECTED ENROLLMENTS

Table 1 -- PROJECTED COLLEGE ENROLLMENTS (RESIDENT DEGREE CREDIT) TO 1982 FOR VIRGINIA (RELATED TO 18-21 YEAR-OLD POPULATION)

Fall of Year	18-21 Year-Old Population	Projected Virginia Residents in College (Head-count Enrollment)					
		Series 1		Series 2		Goal Projections	
		Enroll. as a Percent of 18-21 Pop.	Enrollment	Enroll. as a Percent of 18-21 Pop.	Enrollment	Enroll. as a Percent of 18-21 Pop.	Enrollment
1960	244,677	25.7	62,900	25.7	62,900	25.7	62,900
1965	271,978	33.6	91,498	33.6	91,498	33.6	91,498
1970	325,400	45.6	148,323	45.6	148,323	45.6	148,323
1971	330,000	48.7	160,830	48.7	160,830	48.7	160,830
1972	334,300	52.7	176,044	52.7	176,044	--	--
1973	347,700	54.5	189,548	54.5	189,548	--	--
1974	363,600	56.0	203,616	56.0	203,616	--	--
1975	371,600	57.3	212,927	57.3	212,969	60.1	223,332
1976	380,900	58.4	222,446	58.8	223,942	--	--
1977	385,800	59.2	228,393	60.7	234,311	--	--
1978	391,500	59.7	233,726	61.9	242,448	--	--
1979	392,800	59.9	235,287	62.8	246,667	--	--
1980	390,900	60.0	234,540	63.6	248,660	66.2	258,776
1981	390,400	60.2	235,021	64.3	251,027	--	--
1982	385,400	60.4	232,782	64.9	250,125	68.6	264,384

Table 2 -- PROJECTED COLLEGE ENROLLMENTS (RESIDENT DEGREE CREDIT) TO 1982 FOR VIRGINIA (RELATED TO 18-24 YEAR-OLD POPULATION)

Fall of Year	18-24 Year-Old Population	Projected Virginia Residents in College (Head-count Enrollment)					
		Series 1		Series 2		Goal Projections	
		Enroll. as a Percent of 18-24 Pop.	Enrollment	Enroll. as a Percent of 18-24 Pop.	Enrollment	Enroll. as a Percent of 18-24 Pop.	Enrollment
1960	Not Available	--	62,900	--	62,900	--	62,900
1965	Not Available	--	91,498	--	91,498	--	91,498
1970	561,400	26.4	148,323	26.4	148,323	26.4	148,323
1971	584,300	27.5	160,830	27.5	160,830	27.5	160,830
1972	588,400	29.9	176,044	29.9	176,044	--	--
1973	594,100	31.9	189,548	31.9	189,548	--	--
1974	606,400	33.6	203,616	33.6	203,616	--	--
1975	617,300	34.5	212,927	34.5	212,969	36.2	223,332
1976	636,200	35.0	222,446	35.2	223,942	--	--
1977	654,500	34.9	228,393	35.8	234,311	--	--
1978	667,900	35.0	233,726	36.3	242,448	--	--
1979	675,800	34.8	235,287	36.5	246,667	--	--
1980	679,400	34.5	234,540	36.6	248,660	38.1	258,776
1981	681,200	34.5	235,021	36.9	251,027	--	--
1982	681,700	34.2	232,782	36.7	250,125	38.8	264,384

The enrollment projections presented in tables 1 and 2 are for Virginia residents attending college. Once these had been estimated, it was necessary to distribute those students to the various segments which provide them with higher education services. It was necessary to estimate those going out-of-state to college, those attending private Virginia institutions, and those attending Virginia's state-controlled colleges and universities. In

arriving at such estimates, assumptions were made relative to out-of-state migration of students, and Virginia residents attending Virginia private colleges. Table 3 shows that both these assumptions were held constant in the series 1, 2 and 3 projections cited for Virginia institutions of higher education. The differences in the series are thus reflected in the enrollments of the state-controlled sector.

The number of Virginians going out-of-state to attend college was projected to gradually rise from the last definitely known figure of 39,313 in 1968 to 44,000 by 1982. Net out-migration by 1982, however, is estimated at 9,000, a decrease of 5,770 from the 14,770 figure of 1968. This reflects the probable effects of the further development of the Virginia Community College System and regional and/or urban universities. Thus, the attractiveness and opportunity provisions of Virginia colleges for Virginia residents is projected to increase in relative proportion to the attractiveness of out-of-state institutions.

Projections for the privately controlled institutions estimate an annual growth rate of 2 percent for in-state enrollment through 1978. This is basically consistent with recent historical data for the private sector in Virginia. Beyond 1978, the projections assume that the in-state enrollment of the private institutions will be subjected to the same factors which will cause a leveling off in enrollment in the state-controlled institutions. In 1968 the enrollment of Virginia's privately controlled institutions was comprised of 56.2 percent in-state or Virginia resident students and 43.8 percent out-of-state students. More recent data for the Fall of 1971 suggests that this pattern has not changed. It is projected that the relationship of in-state to out-of-state students will remain constant for the private institutions, and the projected enrollments for the private sector in Tables 3 and 4 reflect this. The projections of total head-count for the private sector in all three series of the projections are the same, and are generally consistent with those published by the Council for Independent Colleges in Virginia in its Fact Book on Private Higher Education in Virginia. It is important to note that the projections presented for the private institutions could be affected by the availability of state financial support to these colleges. The 1972 General Assembly approved two separate tuition assistance programs which would have provided financial aid to students attending private institutions. However, on September 1, 1972, the Virginia Supreme Court ruled provisions of these two programs unconstitutional. It is probable that additional tuition assistance programs will be proposed and their constitutionality decided, but at this time it is extremely difficult to estimate the probable effects of such assistance should it become available.

To estimate the number of out-of-state residents who will be attending state-controlled colleges and universities in Virginia, the projections in Series 1 assumed that by 1982 a total of 83.6 percent of the four-year college and university head-count students would be in-state students. This can be compared with the present 81 percent who are in-state students. Similarly, it was estimated that 97 percent of the two-year college students would be residents of Virginia. This is based on the assumption that the proportionate share of total enrollment for the community colleges that is in-state will remain in the future as has been the case in recent years, and that four-year colleges will have a slightly larger proportion of in-state students. Using these assumptions, the out-of-state students attending state-supported colleges were projected through 1982.

Table 4 presents full-time-equivalent enrollment projections for the state-controlled institutions. These were developed from the historical relationship of approximately 86 percent between full-time-equivalent and head-count students. In other words, full-time-equivalent enrollment was found to be approximately 86 percent of head-count enrollment. This relationship was projected to begin to fall off to a lower percentage, and by 1976 will be 80.3 percent, where it will remain through 1982. This assumption was based on the increased interest shown in higher education by the part-time student. Recent data for Fall 1971 supports this assumption and indicates that FTE enrollment was 84.2 percent of head-count enrollment as compared to 86.6 percent for Fall 1970.

Table 3 -- DISTRIBUTION OF VIRGINIA RESIDENTS IN COLLEGE, 1970-1982

Fall of Year	Series 1			
	Virginia Residents in College (Head-count Enrollment)			
	Total	Going Out-of-State	In Va. Priv. Institutions	In Va. State-Cont. Inst.
1970	148,323	40,500	15,753	92,070[a]
1971	160,830	41,000	16,094	103,736[a]
1972	176,044	41,500	16,416	118,128
1973	189,548	42,000	16,744	130,804
1974	203,616	42,500	17,079	144,037
1975	212,927	43,000	17,421	152,506
1976	222,446	43,500	17,769	161,177
1977	228,393	44,000	18,125	166,268
1978	233,726	44,500	18,487	170,739
1979	235,287	44,500	18,635	172,152
1980	234,540	44,500	18,542	171,498
1981	235,021	44,500	18,550	171,971
1982	232,782	44,000	18,350	170,432

Fall of Year	Series 2			
	Virginia Residents in College (Head-count Enrollment)			
	Total	Going Out-of-State	In Va. Priv. Institutions	In Va. State-Cont. Inst.
1970	148,323	40,500	15,753	92,070[a]
1971	160,830	41,000	16,094	103,736[a]
1972	176,044	41,500	16,416	118,128
1973	189,548	42,000	16,744	130,804
1974	203,616	42,500	17,079	144,037
1975	212,969	43,000	17,421	152,548
1976	223,942	43,500	17,769	162,673
1977	234,311	44,000	18,125	172,186
1978	242,448	44,500	18,487	179,461
1979	246,667	44,500	18,635	183,532
1980	248,660	44,500	18,542	185,618
1981	251,027	44,500	18,550	187,977
1982	250,125	44,000	18,350	187,775

Fall of Year	Goal Projections			
	Virginia Residents in College (Head-count Enrollment)			
	Total	Going Out-of-State	In Va. Priv. Institutions	In Va. State-Cont. Inst.
1970	148,323	40,500	15,753	92,070[a]
1971	160,830	41,000	16,094	103,736[a]
1972	--	--	--	--
1973	--	--	--	--
1974	--	--	--	--
1975	223,332	43,000	17,421	162,911
1976	--	--	--	--
1977	--	--	--	--
1978	--	--	--	--
1979	--	--	--	--
1980	258,776	44,500	18,542	195,734
1981	--	--	--	--
1982	264,384	44,000	18,350	202,034

[a]Actual

Table 4 -- PROJECTED ENROLLMENT FOR VIRGINIA'S INSTITUTIONS OF HIGHER EDUCATION, 1970-1982

Fall of Year	Series 1							
	Private Institutions			State-Controlled Institutions				All Institutions
	In-State[a] Head-count	Out-of-State Head-count	Total Head-count	In-State[b] Head-count	Out-of-State Head-count	Total Head-count	Full-Time-Equivalent	Total Head-count
1970	15,753	12,277	28,030[c]	92,070[c]	15,497[c]	107,567[c]	93,112[c]	135,597[c]
1971	16,094	12,543	28,637[c]	103,736[c]	17,651[c]	121,387[c]	102,671[c]	150,024[c]
1972	16,416	12,794	29,210	118,128	17,808	135,936[d]	114,065[d]	165,146
1973	16,744	13,050	29,794	130,804	19,029	149,833[d]	125,264[d]	179,627
1974	17,079	13,311	30,390	144,037	20,192	164,229	134,604[d]	194,619
1975	17,421	13,577	30,998	152,506	20,710	173,216	139,491	204,214
1976	17,769	13,849	31,618	161,177	21,227	182,404	146,543	214,022
1977	18,125	14,125	32,250	166,268	21,282	187,550	150,678	219,800
1978	18,487	14,408	32,895	170,739	21,328	192,067	154,307	224,962
1979	18,635	14,523	33,158	172,152	21,223	193,375	155,357	226,533
1980	18,542	14,450	32,992	171,498	20,745	192,243	154,441	225,235
1981	18,550	14,457	33,007	171,971	20,821	192,792	154,793	225,799
1982	18,350	14,301	32,651	170,432	20,635	191,067	153,408	223,718

Fall of Year	Series 2							
	Private Institutions			State-Controlled Institutions				All Institutions
	In-State[a] Head-count	Out-of-State Head-count	Total Head-count	In-State[b] Head-count	Out-of-State Head-count	Total Head-count	Full-Time Equivalent	Total Head-count
1970	15,753	12,277	28,030[c]	92,070[c]	15,497[c]	107,567[c]	93,112[c]	135,597[c]
1971	16,094	12,543	28,637[c]	103,736[c]	17,651[c]	121,387[c]	102,671[c]	150,024[c]
1972	16,416	12,794	29,210	118,128	17,808	135,936[d]	114,037	165,146
1973	16,744	13,050	29,794	130,804	19,029	149,833[d]	125,245	179,627
1974	17,079	13,311	30,390	144,037	20,192	164,229[d]	134,487	194,619
1975	17,421	13,577	30,998	152,548	20,710	173,258	139,455	204,256
1976	17,769	13,849	31,618	162,673	21,227	183,900	147,653	215,518
1977	18,125	14,125	32,250	172,186	21,282	193,468	155,335	225,718
1978	18,487	14,408	32,895	179,461	21,328	200,789	161,213	233,684
1979	18,635	14,523	33,158	183,532	21,223	204,755	164,398	237,913
1980	18,542	14,450	32,992	185,618	20,745	206,363	165,689	239,355
1981	18,550	14,457	33,007	187,977	20,821	208,798	167,644	241,805
1982	18,350	14,301	32,651	187,775	20,635	208,410	167,332	241,061

Fall of Year	Goal Projections							
	Private Institutions			State-Controlled Institutions				All Institutions
	In-State Head-count	Out-of-State Head-count	Total Head-count	In-State Head-count	Out-of-State Head-count	Total Head-count	Full-Time Equivalent	Total Head-count
1970	15,753	12,277	28,030[c]	92,070[c]	15,497[c]	107,567[c]	93,112[c]	135,597[c]
1971	16,094	12,543	28,637[c]	103,736[c]	17,651[c]	121,387[c]	102,671[c]	150,024[c]
1975	17,421	13,577	30,998	162,911	20,710	183,621	147,797	214,619
1980	18,542	14,450	32,992	195,734	20,745	216,479	173,811	249,471
1982	18,350	14,301	32,651	202,034	20,635	222,669	178,781	255,320

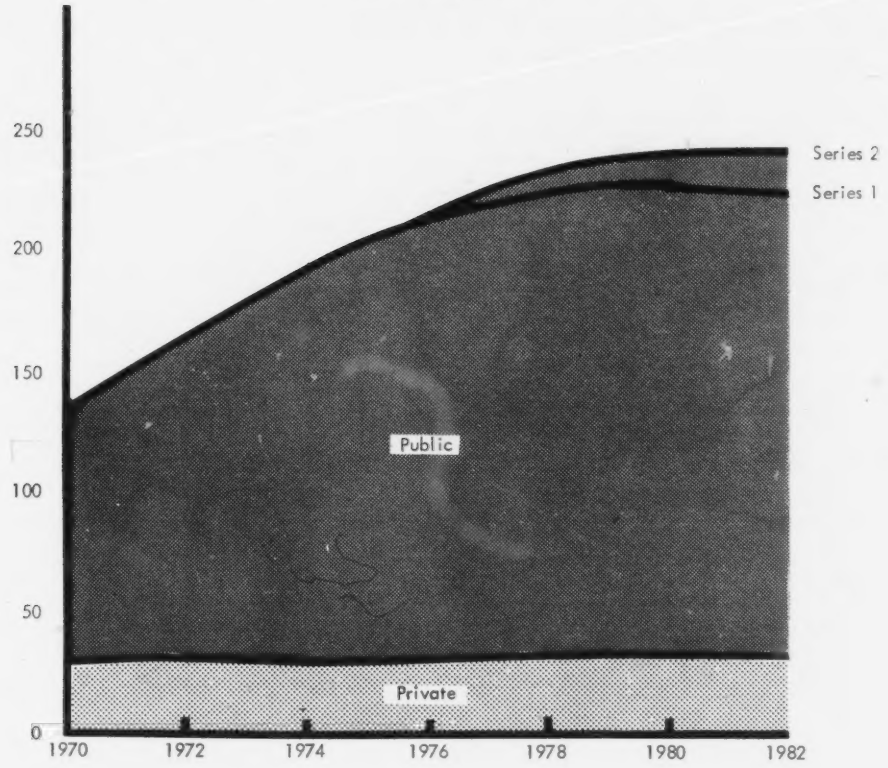
[a] These projections assume that the percentage of students that are in-state Virginia residents will be 56.2 percent, and the percentage that are out-of-state will be 43.8 percent.

[b] These projections assume that by 1980, 83.6 percent of the four-year college students and 97 percent of the two-year college students will be in-state students.

[c] Actual

[d] These are the totals of the institutions' individual projections which are slightly less than the State Council's original projections.

HEAD-COUNT ENROLLMENT IN VIRGINIA INSTITUTIONS
OF HIGHER EDUCATION



CONCLUSION

It can be seen in Table 4 that the projections for both the privately controlled institutions and the state-controlled institutions are essentially the same in Series 1 and Series 2 through 1976. It is beyond 1976 that the two series begin to diverge, and then only for the public colleges and universities. The projections for the private institutions are the same for Series 1 and Series 2 throughout the projection period. The range established by the Series 1 and Series 2 projections will be used by the State Council as statewide working projections within which to review and recommend on projections for the various segments of public higher education (two-year, four-year), and also for individual public institutions. The use of a range beyond the first five years of the projection period is appropriate since the further out in time projections are attempted, the more difficult it is to project accurately. These projections will be reviewed and updated periodically as new evidence suggests the need for change. The establishment of a range of projections within certain limits and based on differing assumptions, beyond the first five years of the projection period, still provide the necessary information for planning both operating and capital outlay funding. It is important to observe that by the 1980's the projections for the state-controlled institutions in Series 1 are between 6 and 7 percent less than those in Series 2. In comparing actual enrollments with earlier projections, the State Council's projections for the state-controlled institutions have historically been within 5 percent of the actual enrollments realized.

In summary, the projections which have been presented for Virginia's private institutions estimate an overall growth of 12 percent from 1972 to 1982, while a similar estimate for state-controlled institutions is for a growth of between 41 and 53 percent. These patterns are reflected in the Series 1 and Series 2 projections and are for head-count enrollment.

Series 1 ASSUMPTIONS

1. It was assumed that the economic conditions of the State and Nation would remain substantially unchanged.

2. It was assumed that there would be no major war or other catastrophe.

3. It was assumed that the migration patterns of college students which affect Virginia higher education would not substantially change, although some decrease in net out-migration was projected. Note: As previously noted Virginia is a debtor state in terms of Virginia residents leaving the state to attend college versus non-residents entering the state to attend college.

4. It was assumed that there would be no major changes in academic and admissions requirements.

5. It was assumed that academic programs offered by Virginia's state-controlled colleges and universities will change to reflect current emphasis and societal needs, but that these changes will not have a direct effect on enrollment projections.

6. It was assumed that retention rates from class to class would remain about the same as experienced during the past several years. Note: There has been a substantially higher dropcut rate between the freshman and sophomore years at community colleges. Therefore, if this rate continues it is possible that with the dynamic expansion of enrollments in the Virginia Community College System, the number of dropouts for the state could substantially increase. In addition, if the senior colleges were to enact broader admissions policies with no substantial change in programs or academic requirements, attrition rates at those colleges might be expected to significantly increase.

7. It was assumed that the State of Virginia would not provide direct financial assistance to the private sector of Virginia higher education.

8. It was assumed that a significantly larger number of transfer students would add substantially to the junior class enrollments of the senior colleges and universities.

9. It was assumed that there would be no major changes in the attitudes of society in general, and potential students and their parents in particular, towards college attendance.

10. It was assumed that the first half of the 1970's would be a period of rapid growth in the rate of college attendance in Virginia. This is an anticipated result of the completion during that time of a community college system serving all regions of the State, and the expansion of regional universities serving the heavily populated urban corridor of Virginia. After 1975, it is assumed that the rate of increase in the college-going rate will increase, but at a decreasing rate. This reflects the major effects of these significant expansions of higher education opportunity on the college-going rate by that time.

11. It was assumed that there would be no major change in the financial aid available to students in relation to the current value of the consumer dollar.

12. It was assumed that tuition and fees would not increase or decrease markedly in relation to the current value of the consumer dollar.

13. It was assumed that Virginia would not be able to achieve national parity in the holding power of its secondary schools by the early 1980's. The achievement of such parity will be critical if Virginia is to reach parity with the national college-going rate. In comparison with a national average of 78.7 percent, Virginia public high school graduates in 1970-71 were 75.9 percent of the ninth graders in Fall 1967.

Series 2 ASSUMPTIONS

1-9. These assumptions are the same as those cited for the Series 1 projections.

10. It was assumed that the influence of the Virginia Community College System and regional universities on the college-going rate would continue to be evidenced beyond 1976 to a greater extent than was assumed in the Series 1 projections.

11. It was assumed that the Omnibus Higher Education Act of 1972, in conjunction with anticipated action by the Virginia General Assembly, would result in a major increase in financial aid available to students. Such action would serve to redirect the financial aid dollar to provide assistance based on need and ability. Such a fully funded statewide financial aid program could significantly increase the college-going rate in Virginia. It is known that the college-going rate overall has been adversely affected by a very low rate of attendance by students from low income families.

12. It was assumed that Virginia would be able to more closely approach national levels in its secondary school holding power by the early 1980's, than it did in the early 1970's.

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DOLLAR DILEMMAS: CHANGES IN COSTS, FUNDING FORMULAS AND BUDGETING

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for the

Workshop for Experienced Institutional Researchers

on

Institutional Research for Stabilizing

and Declining Enrollments

at the

1973 Association of Institutional Research Annual Forum

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INTRODUCTION

The purpose of this paper is to stimulate thought and discussion on financial analysis in institutional research, with particular note of the factor of stabilizing or declining enrollments.

Section I presents a rationale for financial analysis. A frame of reference is identified, variables and constraints are listed, and models of the educational organization are sketched. Some educational process mechanisms are also described.

Section II turns attention to funding formulas and rationales. Brief mention is made of federal factors in institutional funding, with a major emphasis placed on state procedures for recommending funds.

Section III examines the question and response to institutional research on the changing financial environment for higher education.

Section IV is a concluding statement.

SECTION I - COST RATIONALES

A. Frame of Reference

Traditional, mainstream institutions of higher education have been in mind as the frame of reference for this paper. The mainstream has further been thought of as an evolution from small colleges to universities to multiversities. In an abstract way, these institutions can be conceptualized as a three-dimensional matrix of socio-economic interactions which involve people, things, and dollars. Interaction points in the matrix would be defined by objectives, goals, or missions.

B. Constraints on Discussion

Operating funds, and more narrowly the general operating funds, is the domain to which discussion is limited. Capital outlay operations are an important part of the overall financial environment, but the nature of their management differs so from the general operations that they may be considered separately. Brief reference is made to operating funds for auxiliary activities which may have a small functional overlap with primary programs.

C. Variables for a Model

The variables for the models to be described can be classified as: (1) system--objectives, goals, or missions; and (2) process--people, things, and dollars. The primary system variables have been traditionally described as teaching, research, and public service. Process variables will be limited to students, faculty, other staff, equipment, supplies, and dollars.

D. Models

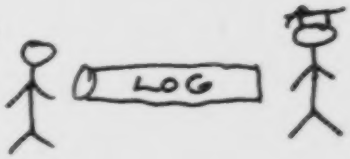
From "Mark Hopkins" to the multiversity describes the set of models developed. In each model there is a system construct, a source of process dollars, and a sink of dollars. The models can be thought of along a scale of developing complexity. They are not intended to be complete, but illustrative.

(1) Mark Hopkins Pair

Construct: 1 Student
1 Teacher
1 Mission (instruction)

Source: Student Fees

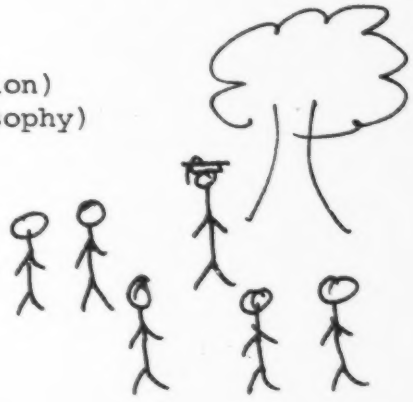
Sink: Teacher Salary



This simple model gives the basic dimensions of the instructional system with a simple process of single

source funding and single sink expenditure. The log is a matter of capital outlay which is excluded from our consideration.

(2) Socratic Group



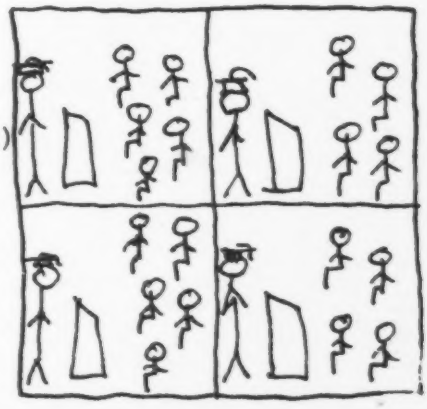
Construct: 1 Mission (instruction)
1 Discipline (philosophy)
1 Teacher
n* Students

Source: Student Fees
State Dollars

Sink: Teacher Salary
Supplies

Assume the state has encouraged "Socrates" to educate the youth and has provided partial support for his salary and necessary supplies. Student fees complete the source of funds for the salary.

(3) Quadrivium College



Construct: 1 Mission (instruction)
4 Disciplines
n Teachers
n Students

Source: Student Fees
State Dollars
Private Donor Dollars

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*n will be used throughout to indicate some number greater than one.

Sink: Teacher Salaries
Equipment
Supplies
Services

Instruction is now complicated by having several disciplines, a building for classes, and a private donor (contribution for purchase of a telescope for astronomy instruction). Services required are for maintenance of the equipment and building.

(4) Small College

Construct: 1 Mission (instruction)
n Disciplines
n Teachers
n Students
1 Administrator

Source: Student Fees
State Dollars
Private Donor Dollars
Investment Dollars

Sink: Teacher Salaries
Administrator Salaries
Equipment
Supplies
Services

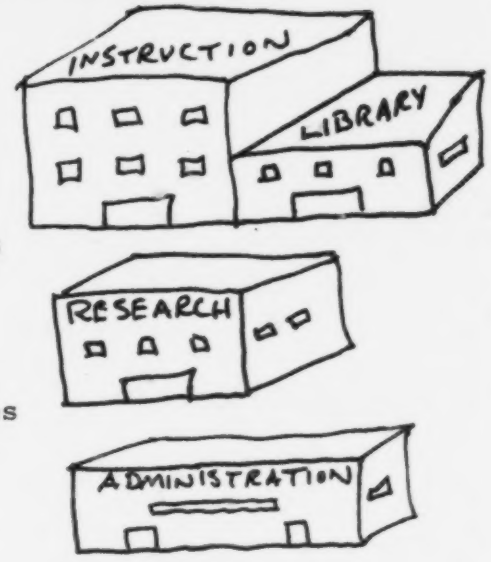
Still essentially a single purpose organization, the small college adds an administrative objective to support the mission of instruction. The administrator manages funds so as to produce a small additional source of funds--investment income.

(5) Modest University

Construct: 2 Missions (instruction and research)
n Disciplines
n Teachers
n Students
n Administrators

Source: Student Fees
State Dollars
Private Donor Dollars
Investment Dollars
Federal Dollars

Sink: Teacher Salaries
Administrator Salaries
Equipment
Supplies
Services
Library



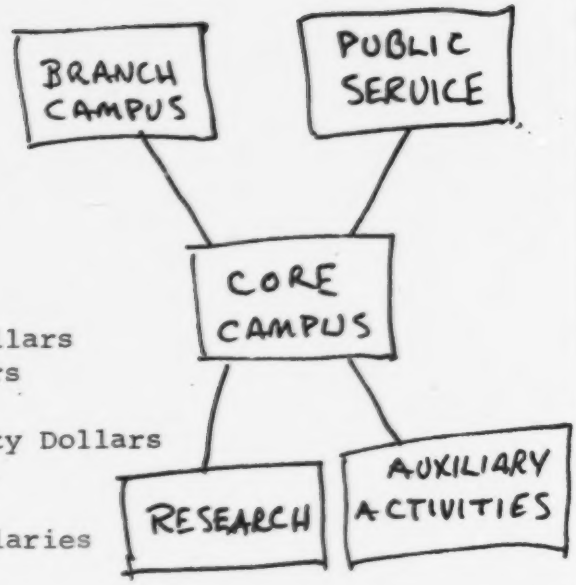
Modest University has grown to include research activities and a library as major components. Federal dollars come in as research project funding or student aid. Although all federal dollars may not be accounted for in general operations, they contribute by "freeing-up" other dollars for general use (e.g., some portion of faculty salaries or equipment expenditures would be covered by research project funds).

(6) Multiversity

Construct:
- n Missions
- n Disciplines
- n Teachers
- n Students
- n Administrators

Source:
- Student Fees
- State Dollars
- Private Donor Dollars
- Investment Dollars
- Federal Dollars
- Auxiliary Activity Dollars

Sink:
- Teacher Salaries
- Administrator Salaries
- Equipment
- Supplies
- Services
- Library
- Auxiliary Activity Expenditures



This multiversity construct is intended to represent the most complex higher education institution with many missions, a physically extensive facility, and the greatest possibility of socio-economic interactions. Although auxiliary activities in principle are to be self-supporting, there may be a modest general funds subsidy for something like parking or a university press.

As was stated earlier, the models described above are intended to be an illustrative spectrum of higher education

organizations. Special mission organizations, community colleges, or private colleges could be depicted by varying the constructs, sources, and sinks.

E. Some Process Mechanisms

When one considers the dynamic functioning of an institution, there are basic process mechanisms related to costs of arranging the components in the models described above. In an abstract way, these can be thought of as time variations in person interaction parameter sets (PIPS) with indices for teacher, student, other staff, equipment, supplies, services, time, space, and dollars. Mathematically, the PIPS would be a tensor quantity with transformation properties.

(1) Instructional Cost Configurations

A simplified view of instructional configurations can be given as follows:

		Teacher	Student
(a) Independent Study	($I_{0,1}$)	0	1
(b) Tutorial	($I_{1,1}$)	1	1
(c) Class	($I_{1,n}$)	1	n
(d) Dissertation	($I_{n,1}$)	n	1
(e) Seminar	($I_{n,n}$)	n	n

If we assume a unit expenditure within a system, for example, $10,000 of faculty salaries during an academic year, illustrative cost aspects of the instructional configurations would be:

	Configuration	Units	Dollars	Students	Dollars per Student
(a)	$I_{0,1}$	0	0	1	0
(b)	$I_{1,1}$	1	$10,000	1	$10,000
(c)	$I_{1,n}$	1	10,000	20	500
(d)	$I_{n,1}$	5	50,000	1	50,000
(e)	$I_{n,n}$	5	50,000	10	5,000

The importance of instructional configuration to cost is illustrated by the cost per student, ranging from $0 to $50,000.

(2) Class Size Cost Factor

Obviously, other assumptions can be made for the class configuration of instruction with one teacher. Again, assuming a unit expenditure of $10,000, the cost per student would be:

Number of Students	Dollars per Student
2	$5,000
5	2,000
10	1,000
20	500
50	200
100	100
500	20
1,000	10

As one looks at this "tempting economic logic," reality creeps in with thoughts about the small number of large capacity classrooms, the logistical problems of large group instruction, and the political and psychological factors of concern, both to students and teachers.

(3) Number of Disciplines Cost Factor

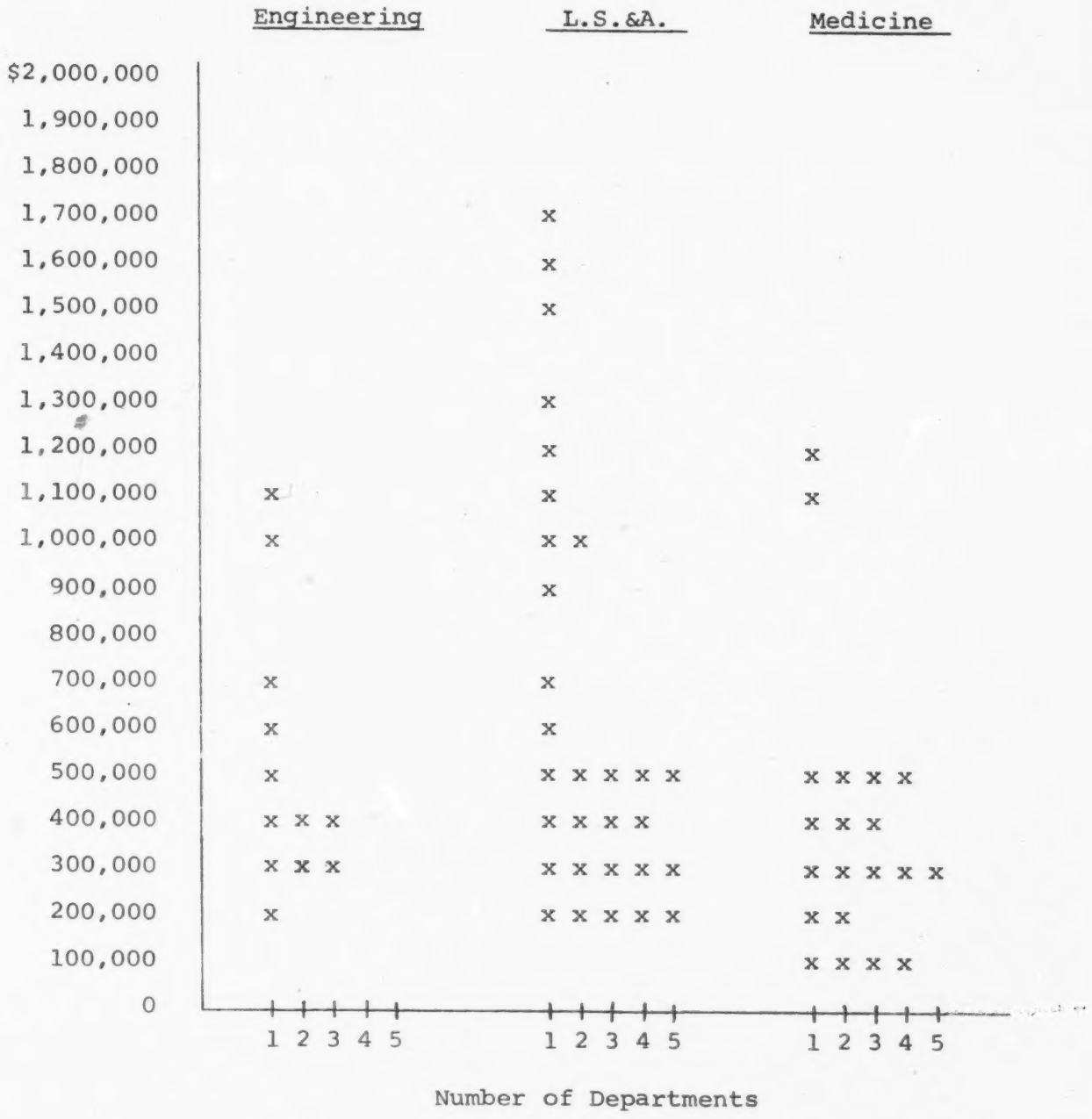
Some research (1) has shown that a "critical mass" number of faculty per discipline is about four or five. Also, the departmental structure of academic organizations has been shown to inhibit interdisciplinary faculty interactions, as rewards of

promotion are based on devotion to "pure" disciplinary contributions. Thus, cost factors per discipline are essentially a linear function for the basic instructional functions. Assuming $15,000 to $20,000 to be the fiscal year salary payment per faculty member, $10,000 to be the departmental support staff minimum, and $2,000 to $5,000 to be the minimum for supplies, travel, etc., one finds that $100,000 per department is an order of magnitude for minimally supporting a viable department or discipline.

Figure 1 shows frequency distributions of the 1972-73 general funds, instruction and departmental research budgets (exclusive of fringe benefits, rounded to $100,000's) at The University of Michigan for the College of Engineering, College of Literature, Science, and the Arts (L.S.&A.), and Medical School. This illustrates the probable maximum costs for departments in a multiversity model approaching $2,000,000 and a mode of about $300,000. These data must be used cautiously as they represent a <u>partial</u> general funds only component of cost.

FIGURE 1

FREQUENCY DISTRIBUTION OF DEPARTMENTAL BUDGETS



The point of this is to suggest that adding a department costs a minimum of $100,000, generally about $300,000, and possibly $2,000,000. The greater costs have developed, of course, over many years.

When one considers dropping a department, the cost decrements are not likely to be the same because there is interdepartmental service teaching which would need to be retained in some portion. A measure of this can be seen in the matrix of Table 1 for selected academic units of The University of Michigan for 1971-72. Looking down the columns for units offering instruction to other units' students, one sees that Unit F is inseparably linked to many others, whereas Units C and I serve no other units.

(4) Mix of Disciplines Cost Factor

Disciplines vary in cost according to the components of human and material resources required to carry out basic instruction. A professional discipline such as medicine or dentistry has high costs for both human and material components. A general studies discipline

TABLE 1

PERCENTAGE CROSSOVER INSTRUCTION MATRIX, 1971-72

Unit Student Enrolled	Unit Offering Instruction									
	A	B	C	D	E	F	G	H	I	Other
A	66	1	--	2	--	29	--	2	--	--
B	--	90	--	--	--	8	--	--	--	2
C	--	--	85	--	--	--	15	--	--	--
D	1	--	--	46	--	47	1	1	--	4
E	--	1	--	--	57	40	--	--	--	2
F	--	1	--	2	--	92	2	1	--	2
G	--	--	--	--	--	--	100	--	--	--
H	--	--	--	1	2	57	--	39	--	1
I	--	--	--	1	--	29	14	--	54	2

may have low costs for both. Law generally has high costs for human resources but low materials costs. Each discipline, according to costs for human and material resources, can be roughly ranked along a scale from low cost to high cost. The institutional mix of disciplines would in turn be a high cost or low cost mix.

SECTION II - FUNDING RATIONALES

A. Introduction

Fundamental economic, philosophical, and social forces which shape the financial environment of higher education must be probed to fully understand the rationales for funding higher education. For example, an expanding industrial society, and even a consolidating "post-industrial" society, needs trained manpower. In a democratic society, struggling with the dilemma of elitism versus egalitarianism, we need a pragmatic philosophy to answer the question of whether education is a right or a privilege. In social accounting--"who pays?" and "who gains?"--the individual or the society might be expected to fund higher education in proportion to benefits.

Full investigation, as hinted at above, is beyond the scope of this paper, so we look to the manifestation of the underlying forces--state governing, planning and coordination agencies for higher education.

Berdahl (2) tabulated the development of these agencies since 1939 (see Table 2) and Glenny and Weathersby (3) noted:

TABLE 2

NUMBER OF STATES IN EACH CATEGORY
OF COORDINATING AGENCY

Category	1939	1949	1959	1964	1969
I. No State Agency	33	28	17	11	2
II. Voluntary Association	0	3	7	4	2
IIIa. Coordinating Board	1	1	2	3	2
IIIb. Coordinating Board	0	0	3	8	11
IIIc. Coordinating Board	1	2	5	7	14
IV. Consolidated Governing Board	15	16	16	17	19

> From 1959 to the present the trend toward the solution of problems has been moving slowly but surely in the direction of centralizing structures and powers and making policy decisions at higher levels at the same time that the problems and their solutions have become more complex and difficult to solve.

Developments in North Carolina, Louisiana, and Wisconsin in recent years demonstrate the continuing trend.

B. Why Funding Formulas?

The growth of higher education in the 1950's and 1960's created a need for assessing and politically defending the allocation of growth funds. Rourke and Brooks (4) noted how the use

of formulas was heavily shaped by considerations external to institutions. Developing institutions saw formulas as a device to "catch up with the established institutions." Established institutions saw formulas as an aid to lobbying for funds from legislatures. Large, research institutions worked to have formula factors to protect their special needs for high cost graduate programs. Legislators found formulas provided simplification, political protection, and a means of reducing conflict with colleagues.

C. The Nature of State Formulas

Most formulas have been developed to determine incremental dollars related to instruction. This requires some measure of students--frequently in student credit hours (SCH), despite their shortcomings--and faculty equivalents (FTE). In some cases, recognition is given to student level of instruction and program. The core of instruction is then used as a base for determining other major functional dollar needs.

(1) Turnbull (5) described a formula used in Florida:

Instruction:	Lower Division	405.29 SCH = 1 FTE
	Upper Division	282.24 SCH = 1 FTE
	Beginning Graduate	218.47 SCH = 1 FTE
	Advanced Graduate	91.46 SCH = 1 FTE

Research:	12 Lower Division Instruction FTE	= 1 FTE
	12 Upper Division Instruction FTE	= 1 FTE
	4 Beginning Graduate Instruction FTE	= 1 FTE
	2 Advanced Graduate Instruction FTE	= 1 FTE
Academic Administration:	13 Instruction FTE (Regardless of Level)	= 1 FTE

(2) Berdahl (6) noted a Connecticut formula which determined dollar values per faculty position:

Lower Division:	300 SCH = 1 Assistant Professor Salary
Upper Division:	180 SCH = 1 Assistant Professor/Associate Professor Average Salary
Masters:	90 SCH = 1 Associate Professor Salary
Doctoral:	60 SCH = 1 Full Professor Salary
Thesis & Independent Study:	25 SCH = 1 Full Professor Salary

Salaries were to be based on AAUP salary scales at midpoint of A and AA rating categories.

Non-faculty positions were determined by factors:

2 Clerical Positions per Dean

1 Clerical Position per Department Chairman

1 Clerical Position per 4 Faculty Members

1 Laboratory Assistant per 50 Laboratory Stations

(3) Rust (7) pointed out some factors used in Tennessee for library and general administration:

Library - A dollar per SCH amount was determined as a base and the calculation used weights by level:

Lower Division = 1

Upper Division = 2

Masters = 4

Law = 6

Doctoral = 8

General Administration - Funding was based on factors per headcount of:

$221 for First 3,000 Students

$199 for Next 3,500 Students

$188 for Number of Students Above 6,500

(4) Berdahl (8) also described an Oklahoma formula which established a budget base equal to faculty salaries plus 30 percent of faculty salaries. Other functions were then funded as a percentage of the base:

General Administration	7%
Organized Research	12
Extension	11
Library	8
Physical Plant	16

(5) McDougall (9) discussed a formula used in the Province of Ontario in which the basic data were full-time-equivalent enrollments by degree program. These were weighted by degree, for example, Bachelor's = 1 and Doctoral = 6. "Basic income units" were computed as the product of the enrollment and program weight, and a fixed dollar per basic income unit was established of the order of $2,000. The funds to be awarded were then calculated as the fixed dollar value times the basic income units minus student fee income.

(6) A number of states have used student/faculty ratios in their formulas (10):

Arizona: The state Board of Regents established a ratio of one new faculty member for each 22 new students enrolled.

California: The Governor's 1972-73 budget for higher education was based on student/faculty ratios which are considerably higher than those now existing. The average used for University of California campuses was a 17.4 to 1 ratio, and for the state college system an 18.25 to 1 ratio.

Kansas: The state Board of Regents established a 20 to 1 student/faculty position ratio.

Minnesota: Fall 1971 funds for state colleges were appropriated on the basis of a 19 to 1 student/faculty ratio at the undergraduate level and a 13 to 1 ratio at the graduate level (including service and support positions).

Missouri: The state Commission on Higher Education established student/faculty position ratios of 22 to 1 for the lower division, 18 to 1 for the upper division, and 12 to 1 for the graduate division.

Montana: The state Board of Education established a student/faculty position ratio ranging from 19 to 1 to 21 to 1 for the various state colleges and universities.

New Mexico: The state Board of Educational Finance established a 24 to 1 student/faculty position ratio.

(7) Although Michigan has not had a precise formula, it has used fiscal-year-equated students (FYES) determined as:

Undergraduate: 31 SCH = 1 FYES

Masters: 24 SCH = 1 FYES

Doctoral: 16 SCH = 1 FYES

Graduate-Professional: 1 Full-Time Academic Year Enrollment = 1 FYES

Michigan's community and junior colleges have been funded in 1972-73 according to the following section of Public Act 247 of 1972:

Sec. 4. Payments to each community and junior college shall be made based upon the following computations:

(a) For colleges with an enrollment in excess of 1,500 FYES and operating as part of a K-12 school district, liberal arts and business and commerce FYES shall be multiplied by $1,091.00, vocational-technical FYES shall be multiplied by $1,656.00 and health FYES shall be multiplied by $2,203.00. For college districts organized under chapter 5 of Act No. 331 of the Public Acts of 1966, as amended, liberal arts and business and commerce FYES shall be multiplied by $1,165.00, vocational-technical FYES shall be multiplied by $1,428.00 and health FYES shall be multiplied by $2,163.00. For all other community college districts, liberal arts and business and commerce FYES shall be multiplied by $1,251.00, vocational-technical FYES shall be multiplied by $1,734.00 and health FYES shall be multiplied by $2,203.00.

(b) The derived operating cost of the college district shall be increased by a factor equal to 50 divided by the total fiscal year equated students of the college district to establish an adjusted gross operating cost.

(c) The adjusted gross operating cost of the college district shall be reduced by a tuition deduct equal to $310.00 for each in-district fiscal year equated student and $465.00 for each out-of-district fiscal year equated student excepting that a reduction shall not be made for fiscal year equated students generated by students who are inmates of a state prison.

(d) The adjusted gross operating cost of the college district shall be further reduced by a local tax deduct equal to the district's state equalized valuation multiplied by 1 mill or $390.00 times the district's total fiscal year equated students, whichever is lesser, for Wayne county community college, by a local tax deduct equal to the district state equalized valuation multiplied by .25 mills, as provided by Act No. 139 of the Public Acts of 1971.

D. Problems in Formula Funding

Rourke and Brooks (11) concluded that:

> The fact that formulas are essentially rules-of-thumb designed to stabilize relationships within the educational system needs to be underscored. These formulas are not designed to produce precise calibrations of educational needs. Certainly they do not rest to any appreciable extent upon research that links the formula in question to the effectiveness of the educational process. Again, the problem of measurement is involved. No one has yet devised a plausible way of proving that a 15-to-1 student-teacher ratio gives the greatest education for the least cost. To the extent that formulas have any empirical base at all, they are most likely to rest on a ratio or cost which simply happened to be in existence at the time the formula was devised.

Berdahl (12) listed three problems related to the use of formulas and cost analysis:

(1) Absence of quality considerations;

(2) Pseudo-objectivity; and

(3) Dangers of control.

The use of presently determined SCH as the "coin of the realm" under careful examination brings out the absurdity of the comparisons that are being made. Heffernan (13) has studied this and has shown the inconsistencies of usage, to say nothing of the quality differences. Formulas have hidden values built into them as to class size, teaching load, instructional methodology, and "appropriate" cost. Instead of being used as a rule-of-thumb predictor, a formula can become an overly simplistic control device in the hands of legislators or state governing boards.

E. Federal Funding Formulas

For several years, federal funds have been provided in institutional training grants designed to increase the supply of needed manpower in fields such as medicine, dentistry, public health, and social work. For fiscal year 1972, Capitation Grants (formerly Institutional Grants) were authorized by the Comprehensive Health Manpower Training Act of 1971. The amount of grant support was to be calculated by the following formula (14):

Two-Year Schools of Medicine

(a) $2,500 for each full-time medical student enrolled in the last two years of the training program of the school.
(b) $1,000 for each "enrollment bonus student" enrolled in the last two years of the medical training program of such school (not to exceed $150,000 per bonus enrollment class).
(c) $1,000 for each full-time student enrolled in such school in a program for the training of physician assistants.

All Other Schools of Medicine, Osteopathy, Dentistry

(a) $2,500 for each full-time student enrolled in the first, second, or third year of a program of study leading to the specified degree.
(b) $6,000 for each graduate of a program of study leading to the specified degree in not more than 3 years from the date of admission as a first-year student.
(c) $4,000 for each graduate of a program of study requiring more than 3 years from the date of admission as first-year students to attain the specified degree.
(d) $1,000 for each "enrollment bonus student" (not to exceed $150,000 per bonus enrollment class) enrolled in the school.

(e) $1,000 for each full-time student enrolled in such school in a program for the training of physician assistants or dental therapists.

Small Medical, Osteopathic, and Dental Schools

If during the first year in which a medical, osteopathic or dental school receives a capitation grant the number of first-year students enrolled is not more than 50, the amount of the capitation grant computation for that year and the succeeding year will be increased by $50,000.

Schools of Optometry

(a) $800 for each full-time student enrolled in a program of study leading to the specified degree.

(b) $320 for each "enrollment bonus student" (not to exceed $150,000 per bonus enrollment class) enrolled toward the specified degree.

Schools of Podiatry

(a) $800 for each full-time student enrolled in a program of study leading to the specified degree.

(b) $320 for each "enrollment bonus student" (not to exceed $150,000 per enrollment class) enrolled toward the specified degree.

Schools of Pharmacy

(a) $800 for each full-time student enrolled in a program of study leading to the specified degree in not more than four years, or $800 for each full-time student enrolled in the last four years of a program of study of more than four years.

(b) $320 for each "enrollment bonus student" (not to exceed $150,000 per bonus enrollment class) enrolled toward the specified degree.

Schools of Veterinary Medicine

(a) $1,750 for each full-time student enrolled in a program of study leading to the specified degree.

(b) $700 for each "enrollment bonus student" (not to exceed $150,000 per bonus enrollment class) enrolled toward the specified degree.

Funding under this formula required enrollment increases.

For 1972-73, the Capitation Grants were funded at about 60 percent of the levels called for in the formula. Furthermore, the fiscal year 1974 federal budget proposals now call for cuts and planned discontinuances of these grants. Institutions have been trapped with enrollment increases that will be several years in the system.

Federal legislation, the Higher Education Amendments of 1972, has subsequently established a National Commission on the Financing of Postsecondary Education. This Commission plans to establish "national uniform standards for determining the annual per-student cost of providing postsecondary education for students in attendance at various types and classes of institutions."

F. Interpretation of Formulas for Stable or Declining Enrollment

Examination of the preceding formulas shows how heavily dependent they are on a concept of student instruction. Even where there are factors for other functions, these are for the most part tied to a "base" calculated in terms of student instruction. If headcounts, full-time-equivalents, or SCH are on a growth curve, such formulas yield a funding increment. Logically, a stable enrollment calls for no increment, and a declining enrollment calls for a cut in the budget base.

Although a formula has not been explicitly used in Michigan, the 1972-73 legislative appropriations were tentatively computed with a component called "enrollment underrun" which deducted funds as follows:

Institution	Under Enrollment FYES Students	Deducted Dollars	Dollars/FYES
A	- 627	$ 646,800	$1,032
B	- 55	48,600	884
C	- 125	151,400	1,211
D	- 100	131,100	1,311
E	- 342	372,100	1,088
F	-1,004	1,097,600	1,093

Variations in the Dollars/FYES factor reflect the prior year's expenditures for instruction. Other factors were included so that no institutions ended up with a budget cut, but some were significantly penalized.

In preparing Michigan's 1973-74 Executive Budget recommendations, budget bureau analysts were faced with an expected total enrollment decline of about 3,400 FYES. A rough, and as yet unclear, procedure was used to avoid the problem, and the Budget Message of the Governor included the following statement (15):

> This year my recommendations do not automatically penalize, as they have in the past, those institutions which reflect enrollments at lesser levels than appropriated. Instead, equity of institutional funding for the various program mixes and levels according to the PBES subcategories and elements was analyzed. In those instances where institutions appeared to be funded at levels less than what seemed adequate for their program complexity, reductions for lesser enrollments either did not occur or their effects were softened.

The reference to PBES (Program Budget Evaluation System) points out a currently developing approach to budgeting which may alleviate the enrollment problem to some extent. Program element considerations will still be inadequate though, as long as instruction is evaluated in terms of SCH increments or decrements.

The imprecise logic of assuming a linear relation between students (or student credit hours) and cost, which has been acceptable in a growth phase, must now be carefully examined in terms of basic costs plus marginal costs. The more reasonable assumption of a step function, wherein some number of students can be accommodated per class up to a point of adding a section or another class, needs to be considered. One can imagine that an enrollment decline of several hundred students might be distributed over a large number of classes so that a few students less per class would result in no cost reduction since all classes would still need to be taught. Costs per instructional

configuration need to be evaluated and the mix of these configurations evaluated to reasonably assess the funding level needed in instructional programs.

SECTION III - RESPONSE AND RESEARCH IN THE CHANGING FINANCIAL ENVIRONMENT OF HIGHER EDUCATION

A. Program Budgeting

Bogard (16) summarizes the development of a major response to the changing financial environment--Planning-Programming-Budgeting Systems (PPBS). PPBS has had great visibility as a management tool since it was introduced in the Federal Government in the 1960's. It emphasizes the objectives (outputs, outcomes) of an organized activity in terms of alternatives related to costs, utility, and a multi-year planning horizon. Bogard found that 31 percent of his study respondents (1,873 of 2,537 institutions of higher education sampled nationally) were using PPBS. These new approaches to higher education budgeting, though, have not solved the difficult problems of financing. Bogard says:

> Perhaps the greatest impact of the PPBS technique, however, is not in the area of solving financial problems but in the area of problem formulation: the way administrators think about problems of the institution.

Basic problems of defining outcomes of higher education and sorting out joint products have not been "technically" solved,

and the political or human behavior factors have significantly inhibited the use of PPBS as a management tool. Schroeder and Adams (17) note:

> In general, PPBS has never been integrated into the decision making process... The failures were apparently due...to the enormity of the problems in reforming a bureaucratic system... It has just not been possible to force the use of the analytical information generated by a PPBS when the basis of decision making continues to be primarily political in nature.

In the Carnegie Commission's report, The More Effective Use of Resources, a pessimistic note is sounded (18):

> Even such an authority as President Charles J. Hitch of the University of California, who introduced this type of analysis in the United States Department of Defense in the early 1960's, has become dubious about its general utility in higher education, at least until a great deal more basic research has been undertaken.

Despite the failures to date and the present pessimism, PPBS in some variant form with political attractiveness, logically has potential to move funding considerations from the present student instruction emphasis. If the higher education systems can be viewed as evolving states of program (academic discipline, support functions, and auxiliary activities), the emphasis could be on increased or extended bodies

of knowledge, achieved either through creation (research) or synthesis (applied public service). The focus could shift to the "enrollment" of scholars, consultants, and practitioners in systems of knowledge subdivided into interdisciplinary work groups. Drug abuse, mass transit systems, urban renewal, seashore management, health care delivery, and environmental pollution are terms with an implied societal need/demand or objective that could define a program.

The major change I am suggesting is a move away from the relatively stable structures of departments with tenured faculty and a major function of student throughput. New programmatic units, somewhat like the institutes that have developed on university campuses, would have as their objective the bringing together of intellectual resources to create and synthesize knowledge for application to a public problem. Such mission oriented groups would be expected to have a planned period of existance and be discontinued as objectives are met. The application or applied aspect need not be a characteristic of all groups--some should simply have as their objective the preservation of knowledge. Units such as museums and special libraries should be maintained with a primary purpose of existing, and only secondarily would there be a purpose of usage by scholars and

students. Basic research units should also be funded with a primary mission of creating knowledge and only secondarily transmitting the knowledge.

Obviously, the new emphases could not be perpetuated without educated personpower; traditional structures of higher education would be continued with primary purposes of instruction or transmission of knowledge. Instead of the cart before the horse, an emphasis on instruction, we would justify higher education first in terms of creation, preservation, and application of knowledge.

B. Institutional Research and Management Information Systems

Bogard (19) also discusses the role of institutional research (IR) and management information systems (MIS), and says the "three preconditions for effective management in higher education" are:

(1) Institutional Research;

(2) A Planning-Programming-Budgeting System; and

(3) A Computerized Management Information System.

The IR and MIS developments of institutions also need to be reexamined in view of the changing enrollment problem. As suggested above for PPBS, a different justification is needed for

the higher education activities, and new concerns will be created for IR and MIS.

C. Research on the Financial Environment

It would be presumptuous of me to propose research methodologies for the intended audience of this paper--experienced institutional researchers. So my approach is to note in the following paragraphs some publications that I have searched out in my preparations. My hope is that I may stimulate an idea or simply provide a reference of value.

(1) Carlson (20) has written The Production and Cost Behavior of Higher Education Institutions--"an empirical analysis of...production and cost relationships between the number of students enrolled and the labor and capital inputs observed over a wide cross section of four-year higher education institutions in the United States." In conclusion, he comments on unit-cost studies:

> Since the observed average and marginal productivities and the observed average and marginal costs are complex functions of input structures, enrollment mixes, and institutional characteristics, the usefulness of

> constructing unit-costs becomes questionable. If unit-costs are to be used in institutional planning, then the changes in the institutional structure that are being proposed will result in changing the unit-costs.

Inspiration for research on structure and configuration of instruction can be found in Carlson's work.

(2) Balderston (21) discusses the "uses of cost analysis for institutional management" in Cost Analysis in Higher Education, and he outlines higher education's financial landscape in Varieties of Financial Crisis. In the latter publication, five conceptual models of financial stress are discussed (22):

1. Expanded Academic Aspiration;
2. Time Passing;
3. Stabilization After Growth;
4. Conscientious Over Commitment; and
5. Income Tapering.

Cost trends in academic operations and the use of educational resources are also presented.

(3) Cheit's report for the Carnegie Commission, The New Depression in Higher Education (23), has received

wide publicity as an analysis of the financial conditions of a select group of colleges and universities. In recent weeks, he has reported an extension of his work in The New Depression in Higher Education--Two Years Later. The headline in The Chronicle of Higher Education for April 16, 1973, characterized his recent findings as "From a State of Steady Erosion to One of Fragile Stability" (24). Another Carnegie Commission report, Efficiency in Liberal Education (25), by Bowen and Douglass, although focused on liberal arts colleges, provides insights into the costs of higher education instruction. Two other reports with "food for thought" are The More Effective Use of Resources and Papers on Efficiency in the Management of Higher Education (see references 18 and 16).

(4) Recently, Trivett (26) has pulled together Small College Management: Key to Survival, a brief overview in the ERIC Research Currents series, which has a fifty item bibliography.

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(5) Gallant and Prothero (27) have presented an interesting analysis of university enrollment in "Weight-Watching at the University: The Consequences of Growth." They call for greater analysis of size optima that are dictated by function.

(6) Breneman (28) edited Internal Pricing Within the University--A Conference Report, which gives some ideas on an "organizational control technique for the decentralization of decision-making that determines intra-organizational resource allocation." Using this technique, "Local decision-makers would be given budgets, university resources would carry prices, and each decision-maker would purchase the most desirable collection of resources attainable within the budget constraint."

(7) Looking back to the proceedings of the Annual Forums of AIR, one finds in 1969 (Ninth Annual Forum) that Wegryn (29) described a cost-revenue-model approach to a formula for distributing state support to public community colleges. In those proceedings, Cohen (30) outlined "quantitative methods and model-building

techniques which can be applied to management planning at institutions of higher education for analysis of 'hard' data." Under attributes of model building techniques, he discussed:

Hard and Soft Data;

Model Building versus Testing;

Identities versus Behavioral Models;

Stochastic or Non-Stochastic Models;

Analytic versus Simulation Solutions;

Micro versus Macro models;

Static versus Dynamic Models;

Predictive versus Descriptive Models; and

Techniques (Regression Analysis, Discriminant Analysis, Stochastic Process Modeling, Linear Programming, and Input-Output Modeling).

(8) In the Tenth Annual Forum proceedings of 1970, Parden (31) illustrated the use of break-even analysis, Shawan (32) presented an absolute dollar approach to expense analysis and projection, and others discussed the potentials of management information systems and program budgeting.

(9) In 1971 (Eleventh Annual Forum), the proceedings contained articles by: (1) Halfter (33), which suggested a ratio index control device "based upon translating into educational use for each department such concepts as contribution margin, responsibility costs versus allocated costs, and break-even analysis"; (2) Bogue (34), which analyzed the relationships between instructional cost patterns and assumptions in unit cost studies; and (3) Raphael and Newton (35), which developed a financial flow model for decision-making.

(10) As the Twelfth Annual Forum theme in 1972 was "Reformation and Reallocation in Higher Education," one finds nearly every article in the proceedings pertinent to our present concerns. Two quotes are noteworthy:

> (1) Our basic problem is to understand the scope of our mission, our institutional conditions, our clients, and what educational experiences are needed (36).
>
> (2) Cost has a special meaning in universities. Universities are spending institutions. Allowing for reserves, they will literally

> spend all the money they get... The problem is not one of precise costing but rather one of forming a value system over and above unit costs which provide the proxies for profits (37).

(11) Lelong (38), in a discussion of allocating and utilizing resources, references the traditional approaches of trend and comparative analyses, but he cautions:

> The traditional analyses...still exhibit the subtle sin of half-truth; they are incapable of telling the whole story. Some means of simplification enabling analysts and decision-makers to trace all the major variables of resource flow and resource productivity appear to be indispensable if we are going to improve both the utilization of resources and our capacity to explain what is being accomplished.

(12) Last year the Management Division of the Academy for Educational Development distributed a "check-list of proven possibilities, for presidents in search of economy and efficiency," titled "319 Ways Colleges and Universities are Meeting the Financial Pinch" (39). These many "ways" are basically divided into means of increasing income and decreasing expenditures.

(13) Finally, I cite two works for which I have only seen reviews, but which seem to be of value in developing research on the problem of present concern:

1. Managing Education Costs, by Phillip H. Coombs and Jacques Hallak (Reviewed in the March, 1973, AAUP Bulletin, page 115); and

2. Productivity and the Academy: The Current Condition, by William Toombs (Reviewed in the March, 1973, Journal of Higher Education, page 253).

SECTION IV - CONCLUDING STATEMENT

As one considers the topic "Dollar Dilemmas: Changes in Costs, Funding Formulas and Budgeting," the superficial observations to be made are that: (1) cost changes are on the increase in a constrained financial environment of limited resources; (2) funding formulas which have been developed are heavily dependent on "student instruction" growth; and (3) new methods of program budgeting, planning, and management information systems have not matured or are not even applicable to higher education systems.

As student enrollments stabilize or decline, institutional administrators are faced with dilemmas of:

"Red Ink" versus Reductions;

Centralization versus Decentralization;

Holism versus Reductionism;

Rationality versus Laissez Faire;

Control versus a Free Market; and

Quantity versus Quality.

But, if we look over our shoulder at the history of higher education, dilemmas have been managed before--a core curriculum

versus free electives, an elite enrollment versus mass education.

I would suggest that the key to alleviating present concerns is an emphasis in our research or analysis on "configurations." We need to find a pragmatic arrangement of national, state, and institutional activities which are concerned with knowledge, and which serve society's interests by optimizing financial and human resources. Within institutions, we need to find the optimum configuration of missions and controls on activities which consume resources. Within a given program, we further need to find an efficient arrangement of the human interactions. All of the above call for a sensitivity to a balanced configuration of political and "hard data" decision-making. The role of institutional research should take on a new importance and provide leadership in managing the present dilemmas of higher education administration.

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FACULTY STAFFING ANALYSIS: WHO STAYS, WHO GOES, AND WHEN?

Prepared by: Herbert E. Coolidge

for the

Workshop for Experienced Institutional Researchers

on

Institutional Research for Stabilizing

and Declining Enrollments

at the

1973 Association of Institutional Research Annual Forum

May, 1973

FACULTY STAFFING ANALYSIS: WHO STAYS, WHO GOES, AND WHEN?

> If we didn't grow we'd die. The economics of higher education demand that you grow constantly as a budgetary weapon. The principle is simply this: you get more money for more students which can be applied to programs elsewhere. Even legislators on a cost-cutting binge will hesitate to cut back the current level of appropriations per student. In other words, if you've established in the previous budget that it costs $1,000 to educate one sophomore and you can show that there will be 25 new sophomores in the next class then the legislature will give you $25,000 practically without question. That extra 25 grand, however, is not necessarily applied to those sophomores: rather, you may use it to pay the salary for an atomic energy professor who may have only 10 special graduate students.[1]
> --Financial Vice-President of a Midwestern State Multiuniversity.

"If we didn't grow we'd die." While that statement typifies much of the 1960's, in 1973, growth is a thing of the past. In the preliminary results of annual enrollment statistics from the Office of Education (reported in The Chronicle of Higher Education of January 15, 1973), state universities in twenty states declined in enrollments this year, and twenty-one states had declines in their state colleges. The summary is "State-supported four-year colleges and universities, which absorbed much of the force of the big enrollment explosion in the 1960's, appear now to be following private institutions into an era of stable--or in some cases declining--enrollments.[2]" The preceding statement takes in the majority of institutions of higher education in this country.

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[1] Is the Library Burning?, Roger Rapoport and Lawrence J. Kirshbaum, New York: Random House, 1969, p. 74.

[2] Larry A. Van Dyne, "Enrollments Leveling Off at State-Supported 4-Year Colleges," The Chronicle of Higher Education, Volume VII, Number 15, January 15, 1973.

What confronts us is this; we are not growing, are we dying? If an examination discloses the existance of vital signs, and for most institutions there is still respiration and pulse, then what treatment can begin to save the institution from its demise? Living with no growth or even declining enrollments has presented higher education with an entirely new set of challenges; challenges that will require both new procedures in administration, but more importantly, a new philosophical approach to higher education. To view a stable enrollment period such as the one that we are now in, only in its financial sense, will result in higher education loosing a valuable opportunity to streamline and revitalize its approach to the entire educational process.

Since the mid 1950's, many large and small institutions, academic giants, and others trying to gain respectability, have been building faculties in almost all disciplines. Virtually all institutions across the country have experienced large enrollment increases due to the "Sputnik" era, the World War II baby boom, and the university as a draft shelter. But times change. With the coming of the 70's, the bloom was off the federally sponsored research plant, the population of college-aged individuals had slowed its rapid expansion, the end of the war in Vietnam and the creation of an all volunteer army, all impacted to produce a college population that was slowing almost to the constant point nationwide. Within many areas of study and at certain levels of instruction actual declines in enrollments were seen. The result of these events which have major dollar implications, as well as enrollment drops, is the forcing of institutions to seriously evaluate their faculty needs,

the resources they already have, and what options are available on both a long- and short-run basis.

To state the obvious, any institution of higher education is primarily a reflection of its faculty. Certainly, physical facilities, libraries and other learning resources are a necessary component of an adequate educational experience, but with all of these must be a competent faculty. Building a strong faculty is a time-consuming operation and an expensive one. Not only does this require large financial outlays each year (up to 80% of the instructional budget), but the institution commits itself to a long-term obligation approaching at least one-half million dollars for each new faculty member. For the major universities and colleges, building a faculty is a much more complicated task than achieving a suitable student-faculty ratio of 15 to 1. The complex concerns (teaching, research, and service) of a university department, demand an intellectually vigorous group. To maintain the dynamics of the faculty requires a wide degree of diversity among the individuals. It also requires a faculty that continues to have new members entering the group and others departing. To achieve this state a number of concerns can be enumerated. There must be a concern for the age span and rank distribution in the faculty, for the sub-areas of the discipline that each member is capable of teaching and/or researching, for how many are on "soft" research money vs. the "hard" money of state appropriations, and for the "teachers" vs. "researchers" that the department has. Other concerns take in publications, research grants received, the institution from which the faculty received their doctorates,

the major "lights" in the discipline that the faculty has studied under or worked with, and maybe the "schools of thought" that may be represented in the department.

A major fear is that the slow down in enrollments will curb the institutions' ability to hire new faculty members. Since the number retiring is small, there will be a low turn over of faculty within each deparment. Kidd uses the term "stagnate" to picture what may well be in store for the better university departments in this country.[3] Can a dynamic faculty be maintained under these circumstances?

A foremost characteristic of faculty staffing in higher education is the lack of flexibility for the institution. Tenure is a primary reason for this inflexible stance, for it almost precludes the removal of a faculty member from an institution who is between 35 and 65 years of age. Thus, points of departure become two in number--those that are not granted tenure and those that retire. Generally, only the former allows the institution some voice, and at this point it can be very limited. In periods of limited employment opportunities, faculties in higher education play an interesting version of "musical chairs." There is no music. Those who have "chairs," i.e., jobs, keep them and those left standing remain so. Loss of a job is quite rare for anyone on "hard" money, unless the entire department is wiped out. Selective faculty reductions are just not a part of the higher education scene. There are many instances of institutions reducing total faculty by freezing positions, thus, those who retire or resign are not replaced.

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[3]Kidd, Charles V., "Shifts in Doctorate Output: History and Outlook," Science, February 9, 1973, p. 542.

Such an approach while reducing cost is not an effective method to realign academic resources. Where then does institutional research enter this rapidly changing picture? What services can it provide to the institution? What types of analysis will be most meaningful? Are there some unused procedures or approaches that might allow some measure of flexibility to the institution?

WHO STAYS?

As a point of departure, the first area of analysis is to thoroughly examine all present members of the institutions' faculty. For those who stay have to be those who are currently here. To be adequately prepared to deal with the current problems, an extensive faculty file is an absolute necessity. Before discussing the content of such a file, it might be well to note that many institutions suffer, not from having a file, but by having too many of them. Each office of the institution which needs faculty information starts their own file, duplicating at least half of the included information and setting in motion masses of data that never coincide with the other files. Such duplication is costly to maintain, but also it can put the institution in an unfavorable light when conflicting reports come from "reliable" sources within the institution. A unified faculty file, containing all needed data on each faculty member that is machine accessible to each user for the information he needs, is not something that is years down the road, but advisable now. That such a file is needed is not the point to be argued. Nor will an attempt be made to list all necessary items of such a file.

(See Exhibit A, which is the form used to maintain the faculty file at the University of Virginia.) The items that have a direct bearing on faculty mobility will be detailed.

1. Name
2. Social Security Number
3. Position Number - if used by the institution
4. Sex - important affirmative action and equal opportunity data
5. Race - important affirmative action and equal opportunity data
6. Highest Degree - institution received from and date
7. Major Field of Highest Degree
8. Departmental Unit
9. Age
10. Years of Service
11. Tenure Status - can be expanded to show years till tenure decision or years since
12. Academic Rank and Years in Rank

The above catagories are not exhaustive, but frame the central core of data necessary to profile the faculty. The use of aggregated data may be useful for institutional reports, but is not refined enough for managerial decisions. Faculty profiles should be developed for each section of the institution; college, school, or department. Such reports should show the following:

1. Highest degree held
2. Age in five-year segments and yearly segments from age 60
3. Percent on tenure
4. Percent within each rank
5. Number of minorities by race and by sex
6. For the non-tenured faculty, a report showing number and years till the tenure decision is most important.

Once developed, data from a faculty file need some type of standard for comparative purposes. Whether there are too many or too few faculty

EXHIBIT A

UNIVERSITY OF VIRGINIA
Office of the Vice-President of Academic Affairs and Provost
Faculty Data Form

IDENTIFICATION

LAST NAME _____ SOCIAL SECURITY NUMBER _____
cc 1-9 all cards

PROCEDURE
(For office use only)

_____ NEW RECORD
_____ REAPPOINTMENT OF PREVIOUS SEPARATION
_____ SEPARATION
_____ DELETION-OTHER THAN NORMAL SEPARATION 888 78-80
_____ SOCIAL SECURITY NUMBER CHANGE
Previous number (must match number in identification box) _____ 1-9
New number (must match number in item #1 below) _____ 10-18 . . . 888 78-80
_____ OTHER UPDATE DATA CHANGES ONLY

PERSONAL DATA AND ADDRESS INFORMATION

1. SOCIAL SECURITY NUMBER _____ m.i. _____ suffix _____
2. NAME _____, _____ _____ _____
Last 10-26 First 27-38 39 40-42
3. SEX _____ 4. RACE _____ ☐ 43 ☐ 44
5. DATE OF BIRTH (MONTH/DAY/YEAR) _____ 45-50
6. CITIZEN OF THE U.S. _____ 7. MARITAL STATUS _____ ☐ 51 ☐ 52 801 78-80
8. HOME ADDRESS Line 1 _____ 10-31
Line 2 _____ 32-51
Line 3 _____ Zip _____ 802 78-80
52-69 70-74
9. HOME TELEPHONE NUMBER _____ 10-16
10. OFFICE LOCATION AT UNIVERSITY _____ 17-46
11. OFFICE PHONE NUMBER _____ ; _____ ; _____ 803 78-80
47-53 54-60 61-67

EDUCATIONAL BACKGROUND

12. TOTAL NUMBER OF DEGREES EARNED _____ 10
13. HIGHEST DEGREE A. INSTITUTION _____ ☐☐☐☐☐☐ 11-16
B. DATE OF GRADUATION (MONTH/YEAR) _____ 17-20
C. DEGREE _____ 21-40 D. LEVEL ☐ 41
E. MAJOR FIELD _____ ☐☐☐☐ 42-45 804 78-80

14. TOTAL TEACHING AND RESEARCH EXPERIENCE AT OTHER INSTITUTIONS. INCLUDE EXPERIENCE SINCE OBTAINING BACHELOR'S DEGREE EXCEPT THAT REQUIRED FOR ANY DEGREE. SHOW NUMBER OF YEARS TO NEAREST FULL YEAR. PUT "00" IF NONE.
A. ELEMENTARY _____ (10-11) B. SECONDARY _____ (12-13) C. HIGHER EDUCATION _____ (14-15)

IDENTIFICATION _____ (1-9)

RECORD OF EMPLOYMENT AT THE UNIVERSITY OF VIRGINIA

15. DATE OF ORIGINAL, CURRENT APPOINTMENT (MONTH/DAY/YEAR) _____ (16-21)
(Definition-date of continuous or uninterrupted employment at the University of Virginia)

16. DATE PROMOTED TO CURRENT FACULTY RANK (MONTH/DAY/YEAR) _____ (22-27)

17. DATE OF CURRENT ELECTION/RE-ELECTION TO PRESENT RANK (MONTH/DAY/YEAR) _____ (28-33)

18. DATE RAISED TO CURRENT RATE OF PAY (MONTH/DAY/YEAR) _____ (34-39)

19. SALARY _____ (40-44)

20. BASIS OF PAYMENT (Check one)
_____ ACADEMIC YEAR (10 mos.)
_____ ANNUAL (12 mos.)
_____ OTHER (Explain)_____

(45-46)

22. Position No. (50-54)

23. Type (55-56)

21. PERCENT OF FULL TIME EMPLOYMENT (FULL TIME= 100%) _____ (47-49)

24. FACULTY RANK _____ (57-58)

25. STATUS (Check if applicable): VISITING _____; ACTING _____ (59)

26. FACULTY DEPARTMENTAL UNIT _____ (60-63)

27. LENGTH OF FACULTY APPOINTMENT _____ (64)

28. TOTAL TEACHING AND RESEARCH EXPERIENCE AT U.VA. _____ (65-66)
(Exclude current year. See definition-item 14)

29. CURRENT LEAVE OF ABSENCE:
A. DATES (MONTH/YEAR): FROM _____ (67-70) TO _____ (71-74)

B. PURPOSE _____ (75)

C. SALARY STATUS: FULL PAY _____; PART PAY _____; NO PAY _____ (76)

805 (78-80)

30. PRIMARY PROFESSIONAL IDENTIFICATION _____ (10-13)

31. ADMINISTRATIVE POSITION:

	A. ORGANIZATIONAL UNIT	B. POSITION OR ROLE	
(1)	_____	_____	(14-17) (18-19)
(2)	_____	_____	(20-23) (24-25)
(3)	_____	_____	(26-29) (30-31)

32. SEPARATIONS:
A. EXPIRATION OF TERM (MONTH/DAY/YEAR) _____ (48-53)

B. RESIGNATION (MONTH/DAY/YEAR) _____ (54-59)

C. RETIREMENT (MONTH/DAY/YEAR) _____ (60-65)

D. DEATH (MONTH/DAY/YEAR) _____ (66-71)

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members and where these variances occur can be determined by various measures of activities or by a theoretical model. However, the discussion of both will be delayed till later in this paper.

WHO GOES?

Now that the institution knows whom it has, and what their status is, after it has decided that reduction may be in order, then who is let go? For sake of completeness the studies mentioned above may indicate hiring additional staff members, but no institution needs to be told how to accomplish this.

There are at least seven different cases where individuals can cease their duties at an institution of higher education. These are instances involving regular or full-time staff members (graduate assistants and other part-time academic help are not included in the discussion).

1. Non-reappointment.--These are one- or two-year appointments, with it agreed at the beginning that at the end of the time period, the institution and the individual will part company.
2. Non-tenured.--Here the assistant professor has served his probationary period and received word that he will not be receiving a permanent position with the institution.
3. Resignations.--For any number of reasons, the professor decides to terminate his association with the institution.
4. Retirements.--The individual has reaced the age where either he may quit or he must quit.
5. Death.--The professor dies before reaching the age of retirement.
6. Disabled.--Because of accidents or illness the professor is unable to continue his activities.
7. Firings.--The institution, for just cause, dismisses immediately a member of its faculty.

What is immediately apparent is that most of the above catagories have no managerial utilization for staff reduction. Managerial utilization is used to signify a planned program of faculty management that has detailed which departments are to be reduced in size; and if possible, which individuals are of least value to the institution in meeting its goals. Certainly resignations, deaths, and disabilities are completely removed from any process, and firing almost so. Of course, firing can be done for financial reasons, but in almost all cases an entire department or unit is wiped out, not one or two members. Both the cases of New York University and St. Louis University are illustrative of this. Retirements can offer some hope, until an examination of staffing patterns shows a very young faculty. Due to the rapid increases in faculty during the 1960's, a very small percentage of the current faculty come up for retirement each year. Thus, who goes falls mainly in the groups of those who have short-term contracts and those who are voted out at tenure time. Both are a removal of staff at the input end, not a selective reduction of staff throughout the entire age and experience specter.

WHEN?

So, when does the faculty leave the institution? Unless they get selected out at the early points of either short-term temporary appointments or at the up or out tenure decision, then in most cases they stay as long as they can. Only those who receive attractive offers can be tempted to move to another institution, where again they remain until mandatorially retired. Without delving deeply into the sociological

and psychological aspects of work, it is generally held that professional types of employment are so rewarding that the employee does not want to retire. Parallels are drawn between college professors and the doctors and lawyers who often continue working well past the sixty-five year limit put on many business and blue-collar workers. But there are a few discrepancies showing in this position. In those few institutions that have implemented a plan for early retirement, a sizable number of professors are showing interest in a plan that allows for early retirement without severe financial implications. At the same time the institution is interested in some flexible plan that does not allow everyone to work past the sixty-five year retirement age that is becoming more of a national norm. Retirement plans will be discussed later on.

What has not been brought into the discussion yet, is how to remove professors from the faculty prior to some retirement date. There are two broad catagories that cover most of these professors. Those that are in areas that are financial drains on the institution and those faculty that are not performing up to minimum expectations, i.e., the deadwood.

The financial problems are handled in a meat-axe fashion, no one is let go, then all are. I feel that institutions in a limited way could improve faculty utilization by selecting faculty from over-staffed departments for new positions in multi-discipline programs, in instructional innovation involving new media approaches, and possible retraining for new areas of teaching or research.

The deadwood problem is usually ignored for a lack of "proper evaluation techniques." Thus, in higher education there exists, at least on the subconscious level, "a save our colleagues approach." Simply by refusing to develop valid evaluatory tools, all of higher education is locked into a once in, in for life, cycle. There is really nothing in the evaluatory process that suggest a lack of due process or other capricious acts. Nor is there any apparent conflict with current tenure procedures. However, until some institution is willing to take the first step, and the flack that will come with that step, any program of faculty dismissal between the tenure decision and retirement will be minimal indeed. What has happened is that faculty are viewed, in a financial sense, more as a capital good then as a labor force that can vary to some degree, in relationship with need. In any down turn in staffing needs, higher education has basically an inflexible staff with the time required to bring it in line with demand often figured in decades.

MODELS AND STANDARDS

In the portion of the paper, WHO STAYS?, mention was made of the need to evaluate staffing requirements. How does one accomplish this? Some of the methods used up to this point are:

1. Student-Faculty Ratios.--On the basis that one professor can serve only so many students, these ratios have been developed. The actual publication of these ratios has declined of late, partly as the validity of the ratios has been questioned and partly because many

institutions have seen their ratio climb. Thus, to continue to publish it would indicate that the institution has declined in quality. These ratios may be on a headcount basis, or a full-time equivalent basis. A recent indication of interest in this ratio is a publication detailing eighty colleges and universities that have student-faculty ratios greater than twenty to one.[4]

2. Student Credit Hours Per Faculty.--As a productivity factor for teaching, student credit hours tend to over emphasize the non-laboratory courses. (Contact hours, on the otherhand, show the laboratory courses in a much more favorable light.) Also, there is no corresponding measure for research and public service. However, if stratified for areas of instruction they may be useful measures, but on an institutional-wide basis they become almost meaningless.

Departmental examples are:

	HISTORY	ELECTRICAL ENGINEERING	CHEMISTRY	ENGLISH	SOCIOLOGY
19xx-xx	1279.1	352.1	617.6	1246.6	2112.0
19xx-xx	1303.9	349.4	539.8	1370.1	2002.9
19xx-xx	1256.1	371.3	522.3	1419.5	1670.5
19xx-xx	1362.6	416.3	508.4	1358.6	1386.4
19xx-xx	1389.7	375.7	481.6	1001.3	1312.9

Student credit hours (on a quarter system) per faculty for the academic year.

3. Hours of Courses.--Gives a picture similar to #2 except the enrollment within the courses are blocked out. Oftentimes the instructional load expected of a faculty member will be expressed in this manner. Twelve hours is a most commonly stated requirement, with

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[4]Higher Education with Fewer Teachers by the Management Division, Academy for Educational Development, Inc., October 1972.

reductions for advanced courses and research duties. It is possible for the professor to carry more than twelve hours if his load repeats sections of basic courses.

4. Section Size.--Following from #3 it is important to know, not only how many hours the professor is teaching, but also how often he is repeating the same course or section. The number of staff needed can fluctuate markedly by raising or lowering the number of sections offered and the frequency that the course is taught.[5]

5. Cost per Student Credit Hours.--While the faculty does not directly appear in this form of analysis, his salary does. When cost appears to be excessive, there may be an effort to analyze the number of faculty involved, because of the direct relationship of faculty to dollars for salaries.

While each of the above approaches has some merit, each institution no doubt suffers from the lack of theoretical models of departments. There are no standards. There is needed a series of parameters for departments of different sizes. The addition of a thirty-seven year old tenured professor in a six-man department is much more limiting on that department's future flexibility than is a similar appointment in a fifty-man department. What appointments can be made in relationship to total size of the department? Is it necessary to control by department, what happens when school is used as the unit of concern? How can the total size of the department be set? Is it impossible to model a

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[5]"The Process of Sectioning" in Financial Analysis of Current Operations of Colleges and Universities by Swanson, Arden, and Still, The University of Michigan, 1966, provides a basic starting point for the further analysis of this problem.

non-laboratory department in a liberal arts college for one hundred majors or a graduate laboratory department in a university with doctoral, masters, and undergraduate majors, plus a large service load? Are there some kinds of staffing standards that would limit departmental excess that raise costs so rapidly with the slightest reduction in demand? Management of the curriculum to limit course proliferation, and control of centers and institutes that add faculty to non-instructional units, but tie the members into departments, are two areas that must be contended with. Beyond this is the problem of instructional productivity. A factors, which in itself (because there has been no real increase in productivity) means rapidly rising educational costs.[6] While not every office of institutional research is capable of developing models or other sophisticated means of analysis, each should be gathering relevant data and bringing to the attention of the institution's administration the implication of their present situation.

TENURE

The recent Commission on Academic Tenure has made several recommendations that directly bear on the problems of staffing. Perhaps the foremost one is the recommendation to limit tenure to not more than two-thirds of the faculty for the coming decade. However, an analysis of many departments will show them already past this point. Many of these same departments have no one reaching retirement age during this decade. This means that no one can be moved up to a tenure position if the

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[6] Productivity and the Academy: The Current Condition, William Toombs, Center for the Study of Higher Education, The Pennsylvania State University, #16, April 1972.

institution is firmly committed to holding the line on tenure at this point. From the institution's viewpoint, they have no choice but to limit the tenured faculty. For many a young professor this presents a baffling set of choices. He can hope to pick up another short-term position at a comparable institution, or maybe accept a permanent position at an institution that cannot utilize to the fullest extent his educational training and talents. Of course, he may also choose to leave higher education for industrial or governmental service. Assuming he stays in higher education he may become a potent force for change. This can result from a real morale problem due to unhappiness, or at least, a lack of total satisfaction with the opportunities that are opened to him. Two areas that seem most ripe for his attention are unionization and abolishment or radical change in tenure.[7]

The Commission also recommends that if financial or academic problems necessitate a reduction of staff, it should be based on guidelines developed in consultation with the faculty. Certainly, if any institution takes this step, the need for a complete analysis of all available data will be a paramount task for the office of institutional research. An addidtional recommendation is for attractive, early retirement or reduced service options for tenured faculty. A look at what this involves will follow.

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[7]"The Future of Tenure" by Robert Nisbet in the April 1973 Change, pp. 27-33.

RETIREMENT

There are basically two types of retirement plans currently used in higher education.[8] The first is a mandatory plan, where all faculty can work to a certain age, then all are retired at that age, all their connections with the institution are severed. The second plan has a normal retirement age, which is the age that most of the faculty retire; however, there is provision for additional work if the institution feels that the specific professor is still needed. These additional appointments are usually on a one-year basis with annual review, there is usually a limit on how long one can work with this type of arrangement.

The mandatory plan offers the institution very little flexibility. All the staff; good, bad, and indifferent can work till the age limit, and yet the plan does not allow for the retention of a few particularly valuable professors. When the mandatory age is set at sixty-five, then the plan works like much of industry. But in much of higher education the age is set at seventy. Certainly with the professor at his peak earning level, the institution may be paying dearly for these years. For instance, at a fixed rate of annual increase of five percent, a salary of $10,000 at age thirty will become $55,160 by age sixty-five. Five more years of employment will raise the salary to $70,400, an increase of over $15,000. Can the institution continue to afford such professors? That depends partly on the cost of a replacement, and on the ability of both potential retirees and new employees. For those

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[8]For a full discussion on retirement plans, see Benefit Plans in American Colleges, by William C. Greenough and Francis P. King, New York: Columbia University Press, 1969.

professors of less than outstanding caliber the answer will be most obvious.

The normal age retirement, with extension included for flexibility, does permit the institution to retain professors of need while limiting the years that other professors will be drawing maximum salaries. This is possible if the institution can exercise the discipline to grant extensions only to those it really needs, not those who would like to continue working.

If the institution can gain some flexibility after the normal retirement age, it needs the same or greater flexibility before normal retirement age. Thus, the recent and growing interest in early retirement. Retirement before the age of sixty-five has not been possible for most individuals financially. Now with better pension plans and more adequate salaries, much of this problem has been mitigated. Several institutions have plans for increased contributions by both institution and professor that allows for a retirement income at an early retirement age, approximately the same as if the professor remains until mandatory retirement age. Other institutions have liberalized their retirement age to as low as fifty-five, if the individual has been employed for a minimum of ten years, while some permit retirement anytime after thirty years of employment. Of course, retiring at this age does not produce as high a retirement income as a later retirement. The preceding statement is true only if the institution uses a "defined contribution" method of determining the payout of their retirement plan, i.e., the retirement pay is based on the contribution of both employee and employer. If a "defined benefit"

method is used, then early retirement can be at a level that shows no decrease in retirement pay, because the formulas to determine the rate of pay can be changed, i.e., instead of 1% of final average salary for each year of service up to thirty years, it can become 1.2% for each year of service up to twenty-five years. All of these plans are at the initiative of the individual, so the institution has no input as to whom is retiring. As indicated in an earlier reference in this paper, a system of faculty evaluation could change this to some degree. However, with an institution-wide plan of position control, certainly there is an increase in staffing flexibility. While it may not be great, it is an improvement that the institution should be taking full advantage of.

Included are two tables showing tenure and age data for selected departments of the University of Virginia. Table 1 shows the percentage of tenured faculty based on the three academic ranks. As has been discussed, only those without tenure are possible candidates for removal from the University. Thus, there is no flexibility in the Department of Electrical Engineering and almost complete flexibility in the Department of Slavic Languages. For those departments that are highly tenured there is little likelihood of promotion for assistant professors. The "stagnation" seen by Kidd becomes more of a real possibility.

Table 2 shows the age spread by rank for the same departments. What is most apparent is that there is a correlation between the two tables. The departments with the highest percentage of tenure also have at least someone retiring shortly. But this must be tempered by the

TABLE 1

TENURE RATIOS AT THE UNIVERSITY OF VIRGINIA

DEPARTMENT	RANK	NUMBER IN RANK	PERCENT TENURED IN DEPARTMENT
Electrical Engineering	Professor	10	100%
	Associate Professor	7	
Law	Professor	43	84%
	Associate Professor	4	
	Assistant Professor	9	
Surgery	Professor	9	75%
	Associate Professor	3	
	Assistant Professor	4	
Government and Foreign Affairs	Professor	14	67%
	Associate Professor	6	
	Assistant Professor	10	
Environmental Sciences	Professor	4	52%
	Associate Professor	8	
	Assistant Professor	11	
Special Education	Professor	2	20%
	Associate Professor	1	
	Assistant Professor	12	
Slavic Languages	Professor	1	14%
	Assistant Professor	5	

TABLE 2

AGE OF FACULTY AT THE UNIVERSITY OF VIRGINIA

DEPARTMENT	RANK	AGE HIGH	AGE LOW	AVERAGE AGE	YEARS TO FIRST RETIREMENT (AT AGE 70)
Electrical Engineering	Professor	69	44	58.4	+ 1
	Associate Professor	49	32	39.4	
Law	Professor	69	31	46.3	+ 1
	Associate Professor	30	28	28.8	
	Assistant Professor	31	26	28.6	
Surgery	Professor	65	39	51.2	+ 5
	Associate Professor	48	39	43.0	
	Assistant Professor	35	31	33.3	
Government and Foreign Affairs	Professor	66	37	53.6	+ 4
	Associate Professor	43	35	38.4	
	Assistant Professor	37	28	31.9	
Environmental Sciences	Professor	48	42	44.8	
	Associate Professor	60	34	42.6	+10
	Assistant Professor	33	27	30.6	
Special Education	Professor	44	43	43.5	
	Associate Professor	36		36.0	
	Assistant Professor	50	27	35.7	+20
Slavic Languages	Professor	38		38.0	+32
	Assistant Professor	37	27	37.8	

average age within rank. Electrical Engineering with an average age of fifty-eight plus for full professors can expect several retirements in the next few years, but the School of Law while also having an individual only one year from retirement has an average age of forty-six plus, more than twelve years lower than Electrical Engineering. One of the prime factors in analyzing age, is the realization that with low average ages the department which suffers a decline in enrollments will have a long time before a new balance in faculty resources can be obtained. Low average ages combined with early tenure decisions can lock in a college faculty in a very short time span, but requires years to undo.

In short, there are no easy and quick solutions to higher education's faculty staffing problems. But the sooner an institution begins a positive thrust to bring some control into play, the sooner the problems will be resolved, even if that is thirty years. No institution can work with a fully tenured faculty, yet in many departments it is or almost is the current situation. While the process may be painful, to those young professors who do not receive tenured positions at institutions they desire or maybe not even in higher education and to the older professor who is put to pasture before he really would choose to be, the vitality of the institution must be maintained if higher education is to move forward. But as an institution of higher education, the institution has the responsibility to go about this task in the most enlightened and humane way possible. Management must preserve the dignity of the individual as well as provide educational opportunities that are both academically and financially sound within the institution.